THE

MEDICAL REPOSITORY.

VOL. II.—No. III.

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SAMUEL L. MITCHILL, *Columbia College.*
EDWARD MILLER, *No.* 158 *Broadway.*

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VOL. II.—No. III.

ARTICLE I.

EXPERIMENTS *relating to the* CALCES *of* METALS; *communicated in a fifth Letter from Dr.* PRIESTLEY *to Dr.* MITCHILL, *dated Northumberland, October* 11, 1798.

DEAR SIR,

AS I have no other view in this discussion than to discover the truth with respect to the question which I have brought before the public, I shall communicate, with the same freedom, what occurs to me in favour of the new system, and facts that seem to make against it. I therefore frankly acknowledge, that I have laid too much stress on the argument from finery cinder not dephlogisticating (or only in the slightest degree) the marine acid, having thought this to be a proof of its containing little or no oxygene. For this effect is not always produced by red precipitate, which is known to contain a large proportion of oxygene, or pure air; nor by flowers of zinc, of which it is always taken for granted to contain much.

On the first pouring of spirit of salt on the red precipitate fresh made, I have had an evident smell of dephlogisticated marine acid, but not afterwards. Also the black powder of mercury and lead, which gives pure air by heat, does not dephlogisticate marine acid, though it makes it give an offensive smell. But then there is other evidence of these substances containing oxygene, not only when exposed to heat, but, with respect to the red precipitate, even when dissolved in the marine acid; and there is no evidence, of any kind, that finery cinder contains this principle. For this solution of the red precipitate, heated with a burning lens, in atmospherical air, causes an addition to its quantity, from the dephlogisticated air expelled from it; whereas, when the solution of finery cinder is treated in the same manner, the contrary effect is produced: the quantity of air is diminished, and the remainder is less pure than before. The same was also the consequence of heating a solution of iron in the same circumstances, and that of finery

cinder precipitated by caustic volatile alkali, and of iron treated in the same manner. Since, therefore, finery cinder, both in this solution and without it, has the same effect on atmospherical air, in which it is heated, that iron has, I conclude that they both contain the same principle, though the finery cinder has much less of it than iron. The same is probable from finery cinder being attracted by the magnet.

Another evidence of a calx containing pure air, or oxygene, is, that when it is revived in inflammable air, fixed air is produced. But this is not the case when finery cinder is revived in these circumstances, though I purposely prepared some by melting iron in the open air; in which case I had imagined that some pure air would be attached to it. In making this finery cinder I observed that steel gained no sensible addition of weight in the process, and even much less than when it is made by means of steam, in a close vessel. When it was prepared in a glass receiver, standing in water, by means of a burning lens, it gained weight; but when it was done over mercury, the addition to its weight was little or nothing.

Since an iron tube is dissolved by heating manganese in it, I thought it very possible that some dephlogisticated air from this substance might unite with the iron, and that the finery cinder made in this manner might be found to contain some. But when I lately heated some iron, affected in this manner, in inflammable air, I did not find any fixed air in the residuum; so that it appeared to have got nothing but *water* from the manganese; being the same thing with the finery cinder which is made by means of steam. Though, therefore, finery cinder not dephlogisticating marine acid, is no proof of its not containing oxygene, no positive evidence has yet been produced that it does, while there is every presumption that it does not; and an entire new system of chemistry cannot be admitted on mere possibilities.

Whenever inflammable air is procured by means of a metal, since water is always present, the antiphlogistians say that it comes from the decomposition of that water. But since they say that water consists of 85 parts of oxygene to 15 of hydrogene, there ought to be some evidence of the production of this proportion of oxygene at the same time; and yet this has not been done by any proper evidence, which is the production of some acid, of dephlogisticated air, or of some substance into which it is acknowledged to enter.

The only reply of the antiphlogistians has been, that whenever inflammable air is procured by means of any metal, that metal is reduced to a calx, and this calx, weighing more than the metal, must contain the oxygene required. And, because the calx of mercury yields dephlogisticated air, and its additional weight is

owing to it, they presume that *all* metallic calces derive their additional weight from the same cause; and, therefore, they do not hesitate, in their new nomenclature, to call them all, without exception, *oxyds*. Thus they call finery cinder a *black oxyd of iron*, though they produce no direct evidence of its containing any oxygene at all. But it by no means follows, that because one calx of a metal owes its additional weight to oxygene, all the rest do so.

Indeed, the calces of the same metals are, in this and in other respects, very different from one another. Finery cinder, for example, is a very different thing from the common rust of iron, consisting of different principles. From finery cinder nothing can be got by mere heat, but from the rust of iron a quantity of fixed air may be extracted. From 1277 grains of this rust, I got 45 ounce measures of air, of which only about a thirtieth part was not fixed air. The remainder (of the standard of 1. 6.) was slightly inflammable, probably from the gun-barrel in which the experiment was made.

The addition that is made to iron by rusting in the open air, I do not find to be more than 30 or 40 grains to an ounce; whereas, the addition made to iron, when it is converted into finery cinder, is near one half of its original weight. I find, however, much variety in this respect. When the finery cinder is made with a burning lens, in the open air, the addition to its weight is the least; and when it is made in close vessels, with steam, it is the greatest. Yet, notwithstanding this great difference between finery cinder and the common rust of iron, the antiphlogistians scruple not to say, but without any examination, that finery cinder is an imperfect oxyd of iron, and the common rust a more perfect one. But if finery cinder ever be converted into rust, which I have never found to be the case, it must, by some process or other, natural or artificial, be first converted into iron, in which case it will lose much of its weight.

The only circumstance that gives any plausibility to the opinion of finery cinder being an oxyd of iron, is the addition that is made to the weight of the iron. But when zinc is treated in the same manner, steam being sent over it in a red heat, the inflammable air is procured, the zinc gains no addition of weight; so that, in this case, there is no pretence whatever for saying that the water is decomposed. The substance that is produced in these circumstances I have somewhere called *flowers of zinc*; because it is a *calx of zinc*; and, at that time, I presumed that it must have all the properties of the common flowers of zinc, which may contain oxygene. But I have treated this peculiar calx of zinc, made without access of air, in all the methods that I can think of, without being able to find any sign of oxygene in it any more

than in finery cinder. When I heated it in common air, the air was not increased, but diminished—the same effect that is produced by heating finery cinder.

As I could find no oxygene in the precipitates of iron dissolved in acids, I have not been able to find any in those of zinc. The most unexceptionable that I could think of is that by caustic volatile alkali. This substance I heated in atmospherical air, both moist and dry, lest exposure to the atmosphere should make some difference in it, but with the same result. The air in which it was heated was rendered much worse than common air, though, in one case, the quantity was increased from $6\frac{1}{2}$ to 8 ounce measures. Of this, half an ounce measure was fixed air, and the remainder of the standard of 1. 8. extinguishing a candle; so that it was almost wholly phlogisticated. It therefore seemed to have imbibed part of the pure air, and to have given out phlogisticated air.

Filings of zinc yield much inflammable air in pure water, though I do not find that they can, by this means, be reduced to a complete calx. But the imperfect calx to which the metal is by this means reduced, does not appear to contain any oxygene. When it was heated in atmospherical air, the quantity of air was increased; about one twentieth of it was fixed air, and the remainder was of the standard of 1. 5. The water in which the filings of zinc had been immersed gave out air much worse than common air, and it was perfectly free from acidity. Iron filings will also yield inflammable air in water, and this water also gives out air that is worse than common air, as does the water over which tin and other metals are calcined.

That the calces of metals do, in general, contain oxygene, I have no doubt, because the dephlogisticated part of the atmospherical air disappears when they are calcined in it. But there is reason to think, that a great part of the addition of weight which they thereby acquire is mere *water*, while the oxygene attaches itself to other substances in preference to the calx, if they be present. One instance of this is, that when they are calcined over lime-water, the lime is precipitated; whereas, if the calx had imbibed all the dephlogisticated air that disappeared, the lime-water would not have been affected by the process: this precipitation of the lime coming, no doubt, from fixed air, which I have sufficiently proved to consist of dephlogisticated air and phlogiston, or the base of inflammable air. I had this result when I calcined iron, zinc, tin, lead, bismuth, and regulus of antimony, in those circumstances. But when the process was made over mercury I could not always find any, and, therefore, presume that all the oxygene was imbibed by the calx, though it may be impossible, in some cases, to extract it again in that form: for, when the

quantity is small, it may be so united to the phlogiston remaining in the calx, as to form the basis of phlogisticated air, which I have proved to consist of dephlogisticated and inflammable air.

Lead furnishes an example of this. No oxygene, I believe, can, by any means, be got from massicot, though it has imbibed some; but when this calx is supersaturated with it, and becomes *minium*, it will yield the purest dephlogisticated air by heat only, and will likewise dephlogisticate marine acid. And, since flowers of zinc will not dephlogisticate marine acid, I presume that this calx also is nearly in the same state with massicot in this respect; and that, in any state, it contains but little oxygene, or so united to phlogiston as not to be obtained either in the form of acid or of dephlogisticated air.

Though the flowers of zinc may contain some oxygene, I have not been able to discover any in them by any process that I have made use of for the purpose. As this substance is made in a considerable degree of heat, I was not surprized to find that heat would not expel any thing from it; but I thought that when it was mixed with iron filings, it might, with them, yield some fixed air, as red precipitate does. But this I did not find to be the case. I got nothing in this process besides inflammable air, as I should have done with finery cinder. Also, when mixed with perfect charcoal, such as gives no air by heat, a great quantity of both fixed and inflammable air is produced, which shews that, like this substance, flowers of zinc contain little or nothing besides water, which will have just the same effect.

To make this experiment with fairness, the iron filings must be heated till they give no air. They must then be well washed till the water put on them be quite clear, and be again found to give no fixed air by heat: for foreign substances are very apt to be mixed with iron filings, which this process will separate. With iron filings, thus prepared, red precipitate gave fixed air, but flowers of zinc none.

There is a *grey calx of zinc*, similar to that of lead, which Mr. Chaptal calls a perfect oxyd. This I find to be only zinc partially calcined. For, on heating it in atmospherical air, it became white: the air was diminished, was without fixed air, and considerably phlogisticated. The perfect flowers of zinc, treated in the same manner, made no sensible change in the quantity of the air; but, as in the former case, there was no fixed air in it, and it was considerably phlogisticated.

The melting of massicot, in these circumstances, made no change, of any kind, in the air; which shows that it contains less phlogiston than flowers of zinc.

Oxygene, in a calx, is, perhaps, most easily detected by its forming fixed air when it is heated in inflammable air. But I did

not find this to be the result of an attempt that I made to revive flowers of zinc in those circumstances. Owing to the whiteness of this substance, which disposes it to reflect, and not to absorb, the light that is thrown upon it, I could not revive any part of this calx completely: a black spot only was made on a part of it, and about an ounce measure of the inflammable air was imbibed; but I found no fixed air in the remainder, any more than I did when I revived finery cinder in that process.

With much respect,

I am,

Dear Sir,

Yours sincerely,

J. PRIESTLEY.

ARTICLE II.

Of some Experiments made with IVORY BLACK, *and also with* DIAMONDS; *communicated in a sixth Letter from Dr.* PRIESTLEY *to Dr.* MITCHILL, *dated October* 11, 1798.

DEAR SIR,

MOST of the substances which have been used to phlogisticate air gain an addition to their weight in the process; in consequence of which it has been taken for granted by the antiphlogistians, that nothing is emitted from them, and that they only imbibe the dephlogisticated air, which is one constituent part of the atmosphere, leaving the other part, which they call *azote*, unaltered. It was, therefore, desirable to find some substance which would not gain any weight in the process, and yet have the same effect in phlogisticating the air: for the dephlogisticated air, not uniting with the substance exposed to it, must necessarily form some other combination.

This end was, in some measure, answered by *steel*, which, according to the common hypothesis, containing more phlogiston than iron, would, I thought, part with more on the application of heat, and receive less addition; and this I found to be the case. But it was more completely answered by *black bones*; which, without gaining any thing by the application of heat, in any circumstances, became *white* in the process. If this be done in common air, as the bones do not imbibe the dephlogisticated air which disappears, this air is disposed of in two different ways: for one part of it contributes to form *fixed air*, and another part forms a different union with something emitted from the bones, and makes an addition to the phlogisticated air. Accordingly, there is more of it found after this process with the black bones than with iron, and many other substances which receive an addition of weight in the process. Whence then, I ask, can come this addition of phlogisticated air, but from an union of phlogiston emitted from the bones, and the dephlogisticated air in the atmospherical air to which they are exposed? Consequently, phlogisticated air, or azote, is not a simple substance, as the antiphlogistians maintain, but a compound. Also, whence can come the *fixed air* that is procured in the same process, but from a different combination of the same elements, and not, as they say, from *carbone*, which is a substance of vegetable origin, and has no place here?

That the thing which constitutes the *blackness* of the bones is the same with that which has always been called phlogiston, is evident from its forming inflammable air, if there be water to supply it with a basis: for I now find, that if they be heated in phlogisticated air, which cannot, by parting with any thing, contribute to their whiteness, they, nevertheless, become white, the air is increased in quantity, and this increase is inflammable air.

For these experiments I find *ivory black*, which is the coal of ivory, used by painters, more convenient than the bones I used before. To prepare this substance for the experiments, I fill an earthen tube with it, and, closing it with clay, expose it, for a considerable time, at least a quarter of an hour, to the greatest heat of a smith's fire, which will expel from it every thing that is volatile; so that no heat that I can apply to it afterwards will affect it, except by means of some other substance with which that which constitutes its blackness has an affinity, and with which it can combine.

Heating a quantity of ivory black, prepared in this manner, in $6\frac{1}{2}$ ounce measures of dephlogisticated atmospherical air, there was no sensible change produced in its quantity; but, on examining it, I found in it one ounce measure of fixed air, and the remainder completely phlogisticated, which is in the proportion of 84 parts in 100: whereas, the antiphlogistians say, that any portion of atmospherical air contains only 73 parts in 100 of phlogisticated air. It is evident, also, that both these substances, viz. fixed air and phlogisticated air, consist of the same elements, viz. dephlogisticated air and phlogiston.

The very different proportions in which atmospherical air is diminished in different processes, is a proof that, in some of them, there must be a generation of phlogisticated air. When air is diminished by iron filings and sulphur, moistened with water, the proportion of phlogisticated air is that which Mr. Lavoisier states, viz. 73 parts in 100. But when I made the mixture without any water, I found that 110 measures were, in six days, reduced only 0 90, completely phlogisticated, which is in the proportion of 81. 8 in 100. Again; 140 ounce measures were, by the same dry mixture, reduced to 113, which is in the proportion of 80. 6 in 100. But some water getting to the mixture, the third time that it was used, 155 ounce measures of air were reduced by it to 116, which is in the proportion of 74 in 100.

By the slow burning of *phosphorus* 60 ounce measures of atmospherical air were reduced to 48, at another time to 48. 5. and 50 ounce measures were reduced to 40, which is in the proportion of 80 parts of phlogisticated air in 100. But by repeatedly firing the phosphorus with a burning lens, 100 ounce measures were reduced only to 89, completely phlogisticated.

That the *diamond* is a combustible substance has been long known; but not having heard of its being burned in atmospherical, or any other kind of confined air, I long wished to do it; and, being supplied by a friend with two small ones, I treated them in this manner, and found that near 90 parts in 100 of the air in which they were burned was completely phlogisticated, and the quantity not being sensibly changed, the remainder was fixed air, which is an effect similar to that of heating *charcoal of copper* in air. The diamonds being very small, and the quantity of air in which they were burned being small in proportion, I will not vouch for much exactness in the result, though the experiment was carefully made over mercury. Whenever I get larger diamonds I will endeavour to make the experiment in a more satisfactory manner. Both the diamonds weighed only three tenths of a grain, and they lost in the process fifteen hundredths of a grain. The air in which they were burned was three fourths of an ounce measure.

I am,
Dear Sir,
Yours sincerely,
J. PRIESTLEY.

ARTICLE III.

An Account of a supposed Artificial Wall, discovered under the Surface of the Earth in North-Carolina; in a Letter from the Rev. JAMES HALL, *A. M. to* JAMES WOODHOUSE, *M. D. Professor of Chemistry in the University of Pennsylvania, &c.*

SIR, *Philadelphia, May* 25, 1798.

NEAR the confluence of South Yadkin and Third Creek, about fourteen miles from Salisbury, in North-Carolina, a phenomenon of great antiquity has been discovered, which has engaged the attention of the curious in that part of the State, and which I have lately endeavoured to explore.

During the heavy rains which fell in the summer of 1794, a cavern of about eight feet deep was formed in the side of a hill, near a small stream of water, by the successive torrents of rain-water which issued from an adjacent field.

The hill is between two and three poles in surface where the cavern is formed, about the middle of which stands a subterranean wall, composed of small stones, laid in a white cement, resembling lime of a very fine texture. The largest stones, among many hundreds which I have examined, do not, in my opinion, exceed twelve pounds in weight, and from that are to be found of all sizes down to the weight of one ounce.

The species of stone is what the Irish call the *black whin*; nor is any other kind of stone to be found in the wall.

The stones incline to an oblong, though they are very irregular in their form.

They are universally laid across the wall; and the angles of each stone are so fitted by those contiguous to it, that it is difficult to enter the edge of a mattock between them, although the cement has lost its tenacious quality, and is as moist as the surrounding earth.

The cement I have examined in not less than forty different places in the wall, and could not find among it any appearance of sand, or common earth, except where there has been an opportunity of the earth mingling with it from the top of the wall.

Both sides of the wall are plaistered with the cement, so that not a stone has appeared when the wall was completed, supposing it to be a work of art; and that this is the case is, in my opinion, evident from this circumstance; that where the cement was washed off from the surface of the wall, hundreds of small stones appeared

within a small space, as if slipped in between the ends of the stones, where they could not be brought into contact, to fill up the chasms with the cement about them; and from the apparent nature and situation of the materials, it appears probable to me, that when the wall was dry, and above ground, it was nearly as firm as a solid rock of the same dimensions.

The wall is about two feet thick, built in a straight line, and perpendicular. It has been traced about ninety feet down the stream below the cavern, and, perhaps, double that distance in the opposite direction. That part I did not measure.

The top of the wall, at an average, is between two and three feet below the surface of the earth, both above and below the cavern, although the situation of the ground on the two sides is very different.

Above the cavern the hill rises abruptly, where the wall rises with it, and, in a few poles, the ground becomes almost level, the stream bearing considerably from the wall.

Below the cavern the wall runs parallel to, and along the declivity of the hill; so that, as far as the wall has been explored, the end which is up the stream is, by a horizontal level, fifteen, perhaps twenty, feet higher than the other.

Where the wall bends over the hill the stones lie in a much more detached situation than in any other place which I examined, and appear as if the lower end had sunk when the cement was in a state of moisture, so as to admit the stones to be drawn asunder, rather than make any particular chasm.

Two circumstances have much excited my curiosity respecting the wall: one is, that it has been explored five feet lower than the surface of the adjacent stream, which runs not more than forty feet distant from the wall, without any appearance of its termination downwards, or of any end, corner or opening discovered in the distance of near three hundred feet in length where it has been traced. The other is, that a coarse gravelly rock embraced the wall on both sides, increasing in hardness as far as the wall has been examined in depth; from which I think these two facts are evident, that, at the time the wall was built, the adjacent stream had no existence in that place; and that, since that time, the rock has been generated.

The wall has had so little tendency to form a concretion with the rock, that, as far downwards as the rock would yield to the mattock where it was dug away, the plaistering stood smooth and entire; and, where the rock is too hard to be dug, and the wall was removed, the cheeks of the rock which embrace the wall are as level and smooth as the plaistering against which it rested. This, I think, incontestibly proves, that the rock has been formed after the wall was constructed.

The depth at which the wall has been examined is supposed to be about fourteen feet. This I could not exactly ascertain, as the wall had been demolished for near sixty feet in length.

It is my intention, if health permit, next August, to endeavour to carry forward a further inquiry, the result of which you may expect by the first convenient opportunity.

I am, Sir,
With much esteem,
Your obedient servant,
JAMES HALL, jun.

Dr. WOODHOUSE.

ARTICLE IV.

DR. WOODHOUSE's REPLY.

SIR,

I HAVE read your account of a supposed artificial wall, discovered under the surface of the earth, in North-Carolina, with great attention.

I am well satisfied, from several specimens of the stones which I have seen composing this wall, that it consists of a mineral substance called basaltes, and that it is a production of nature, and not of art.

My reasons for this opinion are as follow:

The stones answer the description of basaltes given by various writers. They are found of an irregular form, in prisms consisting of several sides, and are of different sizes; some being so small as to weigh no more than one ounce, while others exceed the weight of twelve pounds. The angles fit each other exactly like the basaltes, and appear as if joined by the hand of a skilful workman.

There is a brown ochreous matter found upon the surfaces of these stones, exactly like that on some of the basaltes of other countries. This ochre arises from a chemical decomposition of the stone, called by some spontaneous calcination, and by others efflorescence.

The decomposition is owing to the iron contained in the stones, and its calciuation by air and water.*

Fourcroy has improperly attributed the brown crust with which the stones are covered, to water depositing different kinds of earth between the sides of the basaltic columns; and in Nicholson's Chemical Dictionary† it is called cement with equal impropriety. Columns of the Giant's Causeway, says the compiler of the Dictionary, fit accurately together, being, in some instances, united by a strong cement.

That the brown crust which adheres to the stones, and the fine white friable matter with which you suppose the wall has been

* Il eſt facile de voir que cette decompoſition, cette friabilité dependent du fer qui eſt contenu dans ces pierres, et de ſon oxidation par l'air et par l'eau. French Encyclopædia, art. baſaltes.

† Art. baſaltes.

plaistered, are owing to chemical decomposition, appears evident from the following circumstances: If the brown ochre is carefully scraped off from the stone, the surface will be found to be not of so firm a texture as the internal part; and the white powder, brown crust, and internal part of the stone, are composed of the same principle, in nearly the same proportions.

In some countries the basaltes are so much calcined as to fall to pieces on being removed.

The regularity of the wall, and the number of small stones which appear as if slipped in between the ends of the stones, are no proofs of its being a production of art. The basaltes, in Italy, appear like piles of wood of equal thickness throughout, and extend to a considerable distance. The small stones may have been carried down from the surface of the earth by rain, and deposited in the places where they are now found.

I do not suppose that the rock which embraces the wall, and which, from the specimen you have shewn me, is granite, was formed after the wall, granite being among the first formed substances in nature. The rock has probably been burst asunder by the wall, which is, perhaps, of volcanic origin.

In Cronstedt's Mineralogy there is an account, by Mr. Latrobe, of a rock of granite in Upper Lusatia, which has been rent asunder by a vein of concentric basaltes. In Italy basaltes are often found resting upon a bed of granite.

That there have been volcanos in North-Carolina appears from some specimens of lava sent from that part to this city.

The following experiments were made in order to ascertain the component parts of the American basaltes:

EXPERIMENT I.

One hundred grains of the solid stone were reduced into an impalpable powder, and boiled half an hour in half an ounce of nitric acid, diluted with one ounce of water. The whole was placed upon a filter, and distilled water was added until it passed through the filter—insipid to the taste. The powder remaining upon the filter was siliceous earth, and, when dry, weighed exactly fifty-eight grains.

EXPERIMENT II.

A solution of pot-ash was added to the fluid which passed through the filter until no precipitation took place. The precipitated matter was carefully washed in a large quantity of distilled water, and, when dried, weighed forty grains.

EXPERIMENT III.

This dried precipitate was boiled half an hour in distilled vinegar, in order to dissolve the lime and magnesia which it might contain. The vinegar was filtered and evaporated to dryness. Diluted sulphuric acid was added to the dry matter, in order to form selenite, or the sulphate of lime, and Epsom salt, or the sulphate of magnesia. Distilled water was added to separate the sulphate of magnesia from the insoluble sulphate of lime.

The magnesia was precipitated by a solution of pot-ash, and, when dried, weighed three grains.

EXPERIMENT IV.

That part of the dried precipitate, mentioned in the second experiment, which was not acted upon by the vinegar, weighed twenty-nine grains. It was dissolved in diluted nitric acid, and a solution of the prussiate of pot-ash was added until no precipitation took place. The prussiate of iron was separated by a filter, boiled in a solution of pot-ash, washed well with distilled water, and dried, when it weighed ten grains.

EXPERIMENT V.

A solution of pot-ash was added to the filtered liquor of the last experiment, until no precipitation took place. The precipitate, which was alumine, was well washed in distilled water, and, when dry, weighed sixteen grains.

The proportions of the ingredients composing the American basaltes, from these experiments, are fifty-eight parts of siliceous earth, sixteen of argillaceous, three of magnesia, and ten of iron, which, added together, make eighty-seven. Counting two grains lost in the first experiment, and five in the other, we will have ninety-four grains, which, with six allowed for the lime, will make one hundred grains.

One hundred grains of the white friable matter called cement, and the same quantity of the ochreous crust, were subjected to the same kind of experiments, and gave the following result:

	Silex.	Alumine.	Lime.	Mag.	Iron.	Loss.
White friable powder,	55	16	5	3	12	9
Brown ochreous crust,	54	15	6	3	11	11
Powdered stone,	58	16	6	3	10	7

Upon comparing this analysis with those of Bergman, Mongez, and Faujas de Saint Fond, no great difference will be found in the proportion of the ingredients composing the American basaltes and those of other countries.

Analysis by Bergman, Mongez, Faujas de Saint Fond:

Silex,	52	56	46
Argillaceous earth,	15	15	30
Lime,	8	4	10
Iron,	25	25	8
			6 Magnesia.
	100	100	100

This wall is certainly a great curiosity, and will afford ample room for the speculation of philosophers.

I should be happy to receive any further information upon the subject.

I am, Sir, with the greatest respect,

Your most obedient and humble servant,

JAMES WOODHOUSE.

Rev. JAMES HALL.

June 1, 1798.

ARTICLE V.

Experiments with the EUDIOMETER, *made at Martinique, by Dr.* GEORGE DAVIDSON; *communicated to Dr.* MITCHILL, *in a Letter dated Fort-Royal, April* 7, 1798. (See our vol. i. No. 2. p. 167.)

I HAVE already mentioned the large proportion of oxygene contained in the atmospheric air within the tropics. Having, by accident, got the eudiometer which I had borrowed from Mr. Baker broken, I wrote to my friend George Wilson, of Bedford-street, to send one to your address, and one out here. I have since repeated the experiment, both in the town of Fort-Royal and the neighbouring heights. With equal measures of nitrous air obtained from brass wire, and atmospheric air, there was an absorption of 67. 100. but with two measures of atmospheric air, there was somewhat less, from 52. 100. to 58. 100. that is to say, from three measures, or three hundred parts, there was left two and 42. 100. to 48. 100. I have also tried a mixture of sulphur and iron-filings in a glass cylindrical tube, and found above $\frac{4}{10}$ths of the air diminished. As those experiments were made in the presence of a number of medical gentlemen, who have certified the fact, as they have observed it themselves, I can, therefore, with confidence, speak to the result of our experiments.

We shall now be more easily able to account for the speedy rusting of metals, without having recourse to the action of supposed muriatic soda dissolved in the air. The rancidity of oils, and the speedy fermentation of vinous liquors, may, perhaps, be also owing to the greater heat of the climate; but metals would be less apt to contract rust from the greater heat, if the air contained only the proportion of oxygene which it contains in Europe. Consumptions here are also more quickly fatal than they are in Europe. On some of the West-India islands, such as Barbadoes and Antigua, where less rain falls, and where the heat of the air is kept at a steady temperature by their smallness, and the trade winds blowing over the whole island, without being diverted by high or woody land, consumptions are not less fatal than in the larger and moister islands. This is a fact which all writers upon diseases of the West-Indies take notice of, and which we would principally endeavour to account for from the air being more highly charged with oxygene than it is in Europe. If people, labouring under pulmonary consumption, are sometimes benefited by sea voyages within the tropics, we are to look for the temporary re-

lief afforded in the sea-sickness; the irritable state of the stomach by sympathy preventing the lungs acting in decompounding and absorbing oxygene; and in the determination to the surface carrying off the redundancy by the skin. Their costive habit, whilst at sea, proves that there is more than usual determination to the surface—hence relief to the lungs.

To which are subjoined the two following Certificates. *The respectability of the Witnesses would appear to put the Facts quite out of doubt. The first is from Dr.* CHISHOLM.

[*Within two miles of Fort-Royal, upon an elevated situation.*]

DEAR SIR,

IT is with pleasure I comply with your request respecting the proportion of oxygene in the atmosphere at this place, as ascertained, a few days ago, by means of your eudiometer, and by a composition of steel filings and sulphur. By the first, the quantity, I think, was about 56. 100 parts: for although 57 was given by one trial, yet the medium of all those made was no more than 56. A similar result was given by the common glass tube—a proof I should imagine of the accuracy of the experiment made with the eudiometer. The result of the trials with the filings of steel and sulphur, I think, was about 40. 100 parts. It appears to me to be a singular circumstance, that, although the ground on which the Ordnance Hospital stands is a perfect morass, partially drained, yet a result almost exactly similar to that given by the experiments made with the eudiometer at my house, should take place, with the same instrument, and under circumstances in no way different. The proportion at the Ordnance Hospital, I think, has been 58. 100: and at your house, in the Grand Rue, a situation less swampy, and nearer the sea, it has been 67. 100.

The situation of this place is high, dry, and enjoys as pure an air as it is possible to have in this country. An explanation of so singular a result, in situations so different, is, perhaps, more to be wished for than expected.

I am,
Dear Sir,
Very sincerely yours,
C. CHISHOLM, M. D.
Inspector of Ordnance Hospitals.

Dr. DAVIDSON,
Fort-Royal.

The second is from Capt. HARVEY *and Surgeon* LINDESAY.

WE, whose names are hereunto subscribed, do certify, that we have seen the experiments mentioned in the former part of the letter upon the composition of the atmospheric air, which were made both with Fontana's eudiometer and a cylindrical tube, with nitrous air, obtained from the dissolution of brass in the nitrous acid; and that we found 57. 100. of vital air absorbed in the former, and above half by the latter.

W. M. HARVEY, *Captain,* } *1st West-*
JOHN LINDESAY, *Surgeon,* } *India Reg.*

ARTICLE VI.

Account of the CACHEXIA AFRICANA; *a Disease incidental to Negro Slaves lately imported into the West-Indies.*

By the same.

THERE is a disease to which the negroes, and particularly those lately imported, are much subject: it is named by us *Mal d'Estomac*, or *Cachexia Africana;* and, from a constant symptom which attends it, *dirt eating* by some. (Dr. Hunter. Diseases of Jamaica.) Negroes also, who have been some time in the country, are subject to it, but not so frequently as amongst the former. It occurs in those who have, generally speaking, been badly cloathed, ill fed and lodged, and whose constitutions have been worn out by hard labour. The mind, partaking of the sufferings of the body, is affected with nostalgia, brooding over their ill treatment, separated forever from their friends and relations, and doomed to suffer without daring to complain.

As this disease is strongly illustrative (in my opinion) of the new chemical application, you will forgive my trespassing a few moments upon your time, by giving you a short history, and some few remarks.

The first symptom, and which, indeed, is both the cause and effect, is a fondness for solitude, sadness, grief and despondency, a loss of appetite, or a desire only for what is pungent and stimulant, difficulty of breathing, especially in walking up a hill, a painful gastrodynia, palpitation of the heart, general debility, drowsiness, paleness of the face and palms of the hands, the tongue white, sometimes with an appearance like stains of ink upon it, the lips colourless, the tunica adnata of a glassy whiteness, as also the teeth, the skin of an olive complexion, and cold to the touch, rough upon the surface, the papillæ elevated. Anasarcous swellings of the eye-lids, face and extremities; water is afterwards collected in the belly and chest, and the unhappy sufferer can only breathe in an erect posture, for fear of instant suffocation. The pulse is always small, feeble, and generally increased in frequency towards night. There is, throughout the disease, an unwillingness to attempt motion, and inability to perform it.

The same morbid changes take place throughout the alimentary canal. In consequence of the vitiated state of the gastric juice and impeded digestion, a morbid acidity prevails, and a symptom arises from this cause, which, with some, has given name to the

disease—a habit of eating chalk, dirt, or whatever will obtund acrimony.

This vitiated action is propagated throughout the whole alimentary canal; the lacteals, abraded by the acrimony of new fluids, no longer possess the property of absorbing healthy chyle; hence the lymphatic glands of the mesentery become inflamed and indurated. The blood poor, vapid, and colourless, no longer stimulates the heart and arteries to action; hence asphyxia and sudden death, and those polypose concretions found in the heart after death.

It is to the want of irritability of the blood, that we are to ascribe obstruction of the menstrual flux in women, in this disease.

From this short account of the disease, which has no other merit than truth, you will be prepared for the appearances upon dissection.

The stomach is found much enlarged, and thickened in its coats; the liver sometimes enlarged and schirrous, but always whiter than usual; the gall-bladder sometimes with biliary concretions; the bile never of a healthy appearance, generally thin and watery, and slightly yellow or green; the mesenteric glands indurated and schirrous. Those appearances induced a medical practitioner in a neighbouring island to employ mercury, with a view of removing, as he supposed, obstructions, but a very small quantity of it excited such terrible effects as to oblige him to desist. Accumulated irritability, from the abstraction of the usual stimuli, had rendered them more suscepible to the slightest stimulus.

From this view of the disease, the pathology and treatment of it, I conceive, will be easily understood. Resembling scurvy in some respects, it differs from it only in the symptoms of putrid diathesis not being so obvious—putrid animal food not having been here employed as an article of diet. The same defect of oxygene prevails in both diseases; and it is probable we would find the same benefit from the employment of acescent vegetables; but we have not here the same putrid diathesis to obviate, and the stomach has been already so much debilitated by poor vapid vegetable diet, that it requires a more stimulant plan—animal food, wine, warm cloathing, a gentle treatment. The preparations of iron are here found of the most essential service. Much benefit has also been derived from fermented weak liquors—acescent cane liquor has cured many.

Perhaps there may be also a deficiency of carbon.

I am inclined to think that the lungs have a greater share in separating oxygene than the stomach and alimentary canal; but from the mutual sympathy which subsists betwixt the stomach and lungs, a vigorous action of the former is required to enable the lungs to perform their appropriated action. I conceive, that to

produce scurvy, the abstraction of the usual stimuli, as in the disease, the history of which I have just now given, will be sufficient.

It is remarkable that negroes, subject to this disease, have been much benefited by living in a low situation, near to marshes, which quickly prove fatal to whites; and I have long ago observed this, before I had formed any theory upon the subject. Perhaps the hydro-carbonic air may act as a cordial—It is, perhaps, the nervous æther itself. It has been remarked by medical writers, that the attack of remittent marsh fevers is frequently preceded by an unusual flow of spirits. The system seems to suffer from too high a degree of excitement.

ARTICLE VII.

Concerning the MALIGNANT PESTILENTIAL FEVER *of* GRENADA, *as it appeared in* 1793 *and* 1794; *in a Letter from Dr.* C. CHISHOLM *to the late Dr.* E. H. SMITH.

[The following letter is a reply to ſome remarks on Dr. CHISHOLM's Eſſay on the Malignant Peſtilential Fever of Grenada, by our late colleague Dr. SMITH.* We take the liberty to ſuppreſs ſeveral harſh paſſages in this letter; becauſe the gentleman to whom it is addreſſed is now no more; and becauſe ſuch expreſſions of reſentment, whatever circumſtances of provocation might be ſuppoſed to exiſt, have no tendency to elucidate the matter in controverſy. We ſincerely regret that any unfavourable concluſions concerning Dr. CHISHOLM's deſign in his Eſſay, are to be found in that paper of our deceaſed friend; which, we are perſuaded, a more deliberate view of the ſubject would have induced him to expunge. But, while we acknowledge and lament this miſapprehenſion, we muſt maintain, from long and intimate knowledge of the deceaſed, that no motives could be more pure, honourable and benevolent, than thoſe which directed his conduct: and, whatever error has been committed on this occaſion, it muſt be aſcribed to the ardour of his feelings in every thing that concerned the ſlavery of the unhappy Africans, and the pernicious conſequences which his mind attached to the doctrine of the foreign origin of peſtilential fevers.

Dr. CHISHOLM indignantly repels the cenſure paſſed on his conduct; and, in doing this, he manifeſts the warmth of conſcious integrity, and the irritation of offended honour. As it was never our wiſh to criminate the motives of that gentleman, we obſerve, with pleaſure, the explanations offered in his defence. And we think ourſelves authorized thus publicly and explicitly to apply the language of retraction, which our deceaſed friend had pledged himſelf to employ, when he declared, "I ſhall be as ready to withdraw the cenſures that I have paſſed upon him, ſhould he convince me that they are unmerited, as I have been free to advance them; and in a manner equally public."

After this ſtatement, we have too good an opinion of Dr. CHISHOLM's character to doubt his approbation of what we have done.]

SIR, *Fort-Royal, Martinique, Sept.* 6, 1768.

IN the letter accompanying the Medical Repository, which you have been pleaſed to tranſmit to me, your intention is ſtated to be to give me the earlieſt and beſt opportunity to juſtify myſelf from the imputations that you thought yourſelf conſtrained to caſt upon me—and you add, that I will readily perceive, that if all your arguments, ſubſequent to the narrative part, and founded on

* See vol. i. p. 471.

climate, &c. are false, this will avail me nothing, unless Mr. Paiba's story can be decisively contradicted, and proved to be false. Some animadversions having been published by Dr. Trotter, in his *Medicina Nautica*, on the part of my narrative which relates to Capt. Dodd of the Charon, and the consequences to the Charon and Scorpion of having met with the Hankey at St. Jago, it was my intention, in a new edition of the Essay on the Malignant Pestilential Fever, to give such further proofs of the fair and solid grounds on which I have proceeded, as would remove every doubt from reasonable and unprejudiced minds. As this is still my intention, I forbear entering into any minute discussion here. I shall only, in general, observe, that the narrative which I have given, on the authority of Mr. Paiba, is, in the general at least, correctly such as he gave it to me. The information was not communicated in manuscript, as you state yours to have been, but in conversation. This conversation took place, expressly with a view, as I mentioned to Mr. Paiba, to elucidate the cause of the fever which *then* prevailed. Not being able to account for it by any reasoning arising from the consideration of local causes, and having heard it very generally suggested that it proceeded from infection imported by the ship Hankey, I requested a friend, the honourable Samuel Mitchill, Esq. now the senior member of the council of Grenada, to introduce me to Mr. Paiba, in order that this suggestion might be pursued by the communications that gentleman might be pleased to favour me with. Mr. Mitchill brought Mr. Paiba to my house, and was present during the greatest part of the time the conversation continued. I found Mr. Paiba very willing to give me every information in his power relative to the state of the Bulama or Boulam colony, and of the ship Hankey—but I found him strongly disinclined to fall in with the universally received opinion, that that ship introduced the disease. The particulars I have given are those Mr. Paiba related to me in this conversation; and, in order to be correct, I, immediately after Mr. Paiba left me, committed them to paper. Mr. Paiba promised to favour me with a written account; and, in order to direct that gentleman's attention to the points I considered as of most importance, I drew up a set of queries, and Mr. Mitchill charged himself with the delivery of it. A copy of these I have now in my possession, and a slight attention to them will exhibit my view in framing them, and show the doubts respecting the nature of the epidemic which suggested them. Although I repeatedly, through Mr. Mitchill and Mr. Palmer, the gentleman with whom Mr. Paiba resided in the country, renewed my request to have this promise fulfilled, Mr. Paiba left the island without gratifying it. If no other strong proof existed of something peculiar in the fever which at that time prevailed, the cir-

cumstance of my formally applying to Mr. Paiba for information relative to the state of the Hankey, and of taking the trouble to obtain an interview with him, presents an evidence as conclusive as can well be required by reasonable men. But the belief of the infection of the Hankey was universal, nor was it by any means confined to those whose interest might have been affected by the prosperity of an infant colony on the coast of Africa.

I again declare that the Hankey arrived at Grenada on the 18th or 19th of February, and not on the 19th of March, as you state, I suppose, on the authority of Mr. Paiba. The following extract from the St. George's Gazette of the 19th of February, will incontestibly prove this: "By the ship Hankey, of London, "arrived here yesterday from the island of Boulam, on the coast "of Africa, we are informed that she and another vessel carried "out to that settlement upwards of three hundred adventurers, of "whom *one third* had not survived her departure from that settle-"ment; indeed, the mortality raging there is so destructive to "European constitutions, that the ship's company, the short "time she lay there, were actually reduced to less than a third of "her full complement of men.

"Since framing the above, we have it from good authority that, "of the whole number the two ships carried out, only *ten* were "living when she took her departure."

I again declare that the bedding and effects of the deceased were preserved on board the Hankey, and constituted the seminium of the infection. Capt. William Liddle, of the ship General Mathew, saw them on board; and it was in consequence of that gentleman's representation, the lieut. governor, Mr. Home, entered into a strict investigation of the matter; the general result of which I have given, and the authenticity of it may be depended on. Capt. Liddle is now resident in London, and Mr. Byles, the governor's secretary, is now resident commissary at Grenada; and these gentlemen will readily testify to the truth of my statement. The destructive articles I have mentioned were not thrown overboard till the Hankey arrived at Grenville Bay, when they were destroyed at the request of Mr. Prendfoot, the gentleman who chartered the ship to England.

With respect to your arguments founded on climate and marsh effluvia, I have to observe—1. That your information relative to the situation and construction of the town of St. George's is almost altogether unfounded—2. That the carenage is acknowledged to be the most healthy part of the town, and the bay the least so—3. That the marshes you speak of are covered with mangroves, and subject to the ebb and flow of the tide—4. That the tide rises, in general, about a foot, and, at spring tides, to eighteen inches—5. That the mangrove marshes on the S. E. lie too far distant to af-

fect the town, and are separated from it by the Lagoon, a large sheet of salt water, a considerable isthmus of rocky land, and the harbour—6. That the disease first appeared on shore, in the house of Stowe, Wood and Co. gentlemen belonging to the island of Bermudas, and not in Montserrat, or that part of the town inhabited by the lower and most dissolute part of the inhabitants—7. That the inhabitants of that district of St. George's are almost all free people of colour, and among them the disease never appeared affecting their persons—8. That the inhabitants of the bay were more subject to it, if possible, than those of the carenage—9. That many instances, which I could detail, occurred of gentlemen residing on the hill (another and still more healthy district of St. George's) receiving, most evidently, the infection from others labouring under the disease, who had no connection whatever with the shipping, or with any thing commercial—10. That the infection of the disease was carried to Richmond-hill, and there communicated to persons imprudently approaching too near the infected—11. That the inhabitants of the marshy districts of the island, Grenville Bay, Gouyave, and others, were not more sickly than usual during the years of 1793 and 1794—12. That in 1795, when the insurgents drove these people into St. George's, they became remarkably so, and the pestilence acquired a degree of concentration which, under the same phenomena, rendered it most dreadfully destructive—13. That the white attendants and nurses were remarkably subject to the disease, and many of them, as well as of the medical gentlemen of the island and army, perished in it—14. That, the radius of infection never exceeding ten feet, the avoiding its influence was easy; and, consequently, many, residing in even the same house with the infected, escaped it—15. That during the prevalence of the disease, the inhabitants of the country, aware of its pestilential nature, carefully avoided any personal intercourse with the town, and thereby, in most instances during 1793 and 1794, escaped infection—16. That the questions stated by you (p. 490.) have thus their solution, except one, which shall be discussed more fully elsewhere; viz. "What "was there, in so warm and equable a climate, to arrest so sud-"denly and totally a disease of specific contagion?"—17. That the blacks and people of colour not being subject to its action in any remarkable degree, they carried on the intercourse between the town and country with impunity—18. That, notwithstanding these circumstances, fully two thirds of the white inhabitants were infected during the year 1793, and the remainder, as already stated, received the infection in 1795—19. That Mr. Paiba and Capt. Cox's visiting in different houses without communicating the infection is an argument of no moment, as it is incontestible that the seeds of infection were confined to the bedding and clothes

of the deceased—20. That the statement of Mr. Paiba, relative to the case of Capt. Remington, as quoted by you, is not correct, nor founded on fact; that my evidence for what I have advanced is founded on the information of captains of vessels, who knew all the circumstances of his visit to the Hankey, and of Dr. John Stewart, an eminent practitioner, who attended him at Grenville Bay, when he arrived there—21. That the idea of his having returned to Grenville Bay in an open boat is absurd, nothing of the kind having ever been attempted—22. That your illiberal observation on the first case which I have subjoined to the Essay is refuted by your mis-statement of the date of the arrival of the Hankey, and by 20—23. That the omission of the date of this case I am not accountable for, my partner having attended the patient during my indisposition, and having drawn up the case from memory. My view in inserting the case is chiefly to shew how undecided our opinion, and how imperfect our knowledge of the nature of the disease were at that early period.

One circumstance which I advanced on the authority of the late Mr. Home I mean to withdraw. It is the statement of the consequence to the Charon and Scorpion of their interview with the Hankey at St. Jago. I have lately received from a gentleman of the navy here, a log-book of the Charon, kept by one of her officers during the voyage in question. In this I find that no sickness took place in either of these ships in consequence of this interview. A log-book is unquestionable evidence, and I therefore admit it. Why Mr. Home should mention this as a fact communicated to him by Capt. Dodd, I can assign no reason.

Upon the whole, I feel the strongest conviction that the Hankey introduced the infection of the fatal fever which prevailed in Grenada in 1793; a conviction arising from no prejudice in favour of any opinion or theory—from no sinister motives—from no design to furnish arguments against the abolition of the slave-trade.

I shall add a few words on the argument you have affected to deduce from the appearance of a singular fever in the years 1791 and 1792, in the detachment of royal British artillery stationed at Grenada. You wish to torture this into a support of your opinion; but a careful and dispassionate perusal of my paper on that subject will clearly show, that the morbid causes there stated, had not, and could not have any affinity to those of the malignant pestilential fever. The disease was confined to a small spot totally unconnected with, and distant a mile from the town of St. George: it affected only the inhabitants of that spot: and when these (the artillery) were removed from it to a more healthy situation, it altogether ceased. This fever was extremely different indeed from that which appeared in 1793, although a few of the

symptoms bore a slight resemblance. The observation I made to Mr. Paiba, when he had described to me the fever which so fatally prevailed on board the Hankey at Boulam, or Boulama, applied only to the fever of 1791 and 1792—not to the disease which then prevailed at Grenada, or rather in the harbour; for I believe, at that time, the infection had not reached the houses of the town. A resemblance undoubtedly could be perceived between that fever and that described by Mr. Paiba, and it was so remarkable that I took notice of it to him. Any person who attentively and candidly peruses the passages of the Essay which relate to this subject, and who sees things in their true light and form, must observe that I have no where mentioned, far less maintained, that the plague prevailed on board the Hankey—they will perceive that a fever, proceeding originally, perhaps, from the inclemency of the season, and the circumstances of the situation of the adventurers, had become, by confinement, filth, consequent impurity of air, and depression of spirits, a true jail fever, or a fever of infection, heightened to an almost pestilential virulence. Infection, proceeding from a source such as this, and retained and concentrated by the preservation, the pertinacious preservation, of the bedding and clothes of the dead, might certainly have been sufficient to produce the most dreadful effects.

I may here observe, that it was in consequence of a request of Dr. Duncan, of Edinburgh, I first seriously thought of offering to the public an account of the malignant pestilential fever. That gentleman, in a letter dated the 14th of November, 1793, says, "If you have drawn up any account of the late very fatal fever, "which, we are told in the newspapers, was imported from Sierra "Leone, and has, of late, prevailed in Grenada, its being speedily "communicated to the public, by the same channel, (the Medical "Commentaries) will be a singular favour to me, and, I trust, a "real benefit to the public." In compliance with the Doctor's request, I began what I imagined would have been comprized in a paper sufficiently limited for his purpose; but the subject grew upon me, and I, sometime after, informed him that I found it so important as to demand a distinct treatise. This will account for the deficiency of date in the first case, which is made an argument against the purity of my intention in publishing, as well as for no cases prior to the month of June appearing in the collection. A habit of observation I early in life acquired, by committing to paper every circumstance capable of elucidating the diseases which occurred in my practice whilst surgeon to the 71st British regiment, during the late war in North-America; and since, during my residence in the West-Indies, in private and public practice. It is not, therefore, to be supposed, that my observations on the disease in question commenced subsequent to the receipt

of Dr. Duncan's letter. The greatest part of the particulars which have met the public eye were collected, but not arranged, long before; and the account of the origin of the disease was drawn up very soon after my interview with Mr. Paiba.

I shall take leave to offer one remark, whilst on the subject of imported infection, as it relates to New-York: During a considerable part of the years 1776 and 1778, my duty led me very much to reside, for weeks together, in that city; and, during my residence, particularly in the summer and autumn of 1778, which were remarkably hot, and infufferably so, in the lower streets of New-York, no disease of a very alarming nature, and none which assumed the form of an epidemic, appeared among the troops or inhabitants. The smell from all the slips, and from those in particular delineated by Dr. Seaman, was in the highest degree offensive. The police, at that time, was by no means strict: putrid substances of every description were accumulated in the slips, and in many parts of the city unconnected with the wharves, yet no disease was the consequence.

I have the honour to be,

Sir,

Your obedient and humble servant,

C. CHISHOLM, M. D.

Dr. E. H. Smith.

ARTICLE VIII.

Observations on Soda, the Alkaline Basis of Animal Gall and of Sea-Salt, and the Effects it produces in the Concoction of Food, and in preserving Provisions; in a Letter from Dr. MITCHILL *to* JAMES WOODHOUSE, *M. D. Professor of Chemistry in the University of Pennsylvania, dated New-York, Dec.* 23, 1798.

FROM the facts stated in several of my former essays, I think the antiseptic powers of alkaline earths and salts are incontestibly established. These substances seem to have been produced, in the economy of nature, to make a stand against that predominant acidity, which, without their interference, would threaten the animated world with ruin.

But alkaline substances are not only strewed over the face of the earth, to exercise their neutralizing operation there: *soda* exists in the waters of the ocean, combined with muriatic acid, and in the gall of animals, united to an inflammable resin. And both sea-water and bile excite, though in different degrees, a bitter taste.

Many animals that have plenty of gall are greedy of sea-salt. Even wild creatures, in the American woods, can be tempted by it to approach a man who carries salt in his hand. The instinctive appetite for this substance is a very remarkable thing, and is worthy of particular consideration. Sea-salt has been denominated *muriate of soda;* and for the sake of uniformity, and to make the subject a little clearer, I shall, at this time, for want of a better name, and without contending for the propriety of it, call bile, or gall, the *bitter of soda*. It cannot be improper to make an approximation in terms where there exists a strong analogy in nature.

Though the soda which NEWMAN (2 Chem. Works by Lewis, p. 433.) obtained from gall by incineration, might be said to have been produced by the fire, yet the experiments of FORBES, (Essay upon Gravel and Gout, p. 119, 120.) and SAUNDERS (Inquiry into the Properties, &c. of the Bile, Exp. 5 and 6.) if there were no other authorities, put the existence of that alkali, as a native ingredient of healthy bile, entirely out of doubt. It would seem, therefore, that the *bitter of soda*, or the *gall*, should not of itself be prone to corruption, nor to promote putrefaction in other bodies. This fluid does, in fact, resist intestine changes more than most products of animal secretion.

I remember, ever since my childhood, the custom of American husbandmen to save the gall of the beeves they slaughtered

for family use in autumn. A piece of the liver was cut out with the whole gall-bladder, and generally hung up on a neighbouring tree. Perhaps it was carried into the kitchen, and stuck up there, or, perhaps, remained in the tree until the next summer. In either case, whether exposed to culinary warmth or wintry cold, the contents of the cyst underwent no sensible change, saving a thickening by the drying away of its moisture. There was never any putrefaction or sign of taint. The use for which they kept it was for plaisters to put on the feet of their children and labourers when wounded by nails and thorns; and I question whether pharmacy can furnish a better one.

In respect, then, to its uncorruptibleness, the bitter of soda has a near resemblance to the muriate of soda; that is to say, it will remain an indefinite time, in exposure to common atmospheric agents, without undergoing decomposition.

Surely, then, the *acrimony*, the *putridity*, the *causticity*, and the *numberless mischievous qualities* ascribed to bile by modern writers, are not real conditions of that liquid, but notions of their own heads. Far different from such false and fabricated statements is the action of that *natural soap*. Mild, wholesome and incorruptible, the bitter of soda stands ready to check the growth of acidity, to prevent the accumulation and the consequences of nastiness, and limit the progress of the alimentary mass in its tendency to corruption.

If disorders of the alimentary canal are sometimes accompanied with a great flow of the bile, the bitter of soda flows to wash away or neutralize the offending cause in the stomach or duodenum. As a mote in the eye stimulates the lacrymal gland to secern tears, and prevent its injurious effects, so an acid stimulus in in the primæ viæ excites the liver to prepare and send forth a sufficient quantity of the bitter of soda to overcome it. Such is its kind and pleasant operation. Never have I found any thing like an experimental proof of its injurious qualities. Yet the mischievous effects of substances swallowed, and corrupting in the intestines, have generally been ascribed to the bile, which is spoken of with a vehemence and repetition of abuse that hardly any thing could exceed. As well might the nausea and giddiness from a quid of tobacco be ascribed not to the herb, but to the spittle which it stimulated the salivary glands to pour into the mouth. With as much propriety might blisters of the skin be ascribed to the serous fluid effused by the exhalant arteries, and not to the epispastic of cantharides.

Experiments have abundantly shewn, that muriatic acid, poured upon bile, combines with the soda, and constitutes common salt. In these experiments the bitter of the bile is precipitated or set loose. It does not yet appear to be quite settled wherein *bitters* exactly

differ from *astringents*. With respect to their composition, I suspect the difference is rather in *degree* than in *kind*. If so, then, as *astringency* consists in the combination of the gallic acid and the earth of alum, there can be conceived nothing injurious to health in that portion of the secretion of the liver.

If muriate of soda can be thus produced artificially, and *out of the animal body*, there can be no doubt of the possibility of its formation by a natural process *within* the body, where the spirit of salt is taken as an article of food or of medicine. GLAUBER seems first to have practised the extraction of this singular and moderate acid from its alkaline basis in sea-salt, (2 Boerhaave Chem. Proc. cxliii.) and to have given an account of its excellence in diet and domestic economy. BOERHAAVE describes it as "remarkably agreeable to the stomach, promoting appetite, "attenuating mucus, assisting digestion, preventing putrefaction," &c. and concludes the character of this liquid procured from sea-salt by affirming, that "it is above all praise." (Ibid.) And HOFFMAN (Obs. Phy. Chem. lib. 2. Obs. xvii.) speaks of the using of spirit of salt with flesh broths as a common practice. It is rather a pity the oxygenated forms of this acid and their combinations have chiefly attracted the notice of the more modern chemists.

Yet, though the spirit of salt is so safe and valuable a preparation, the untutored appetite of man and other animals has led them to prefer the muriatic acid in conjunction with soda, that is, sea-salt or common salt, to the spirit of salt itself. There must be a reason for this; and this reason, which is founded deep in the nature of things, is worthy to be searched for.

Thus the constitution of many creatures is supplied not only with the *bitter of soda* furnished by the liver, but with the *muriate of soda* taken in with the food. Then the question before me is, What are the chemical effects of the muriate of soda taken into the stomach with the aliment? Now, I say, in creatures who eat substances which contain septon, or the basis of the acid of putrefaction, there may happen cases of surcharge, retention, or indigestion; and, at such times, may be formed within the stomach or intestines a portion of that offspring of corruption, the septic acid, after the same manner as in other putrefactive processes. Besides the agreeable stimulation afforded by the muriate of soda to the palate and stomach, its alkali lies ready to seize and neutralize any little parcel of septic acid that may happen to be produced. After this manner, that injurious acid is taken out of circulation, and the mild and salubrious spirit of salt is extricated in its stead. And, in a similar way, the soda of sea-salt has an operation in the stomach similar to the soda of the gall in the intestines. In the former case the muriatic acid is set loose—in the

latter the bitter principle. In both the soda will quit its present connections, to combine with a stronger acid. In such cases cubic nitre is the new product. Where no acid is generated, there will be no decomposition of either. The reason, then, is apparent, wherefore it is better to take the muriatic acid *with soda* than without. There may be a farther use, that from this source the bile itself may derive its alkali.

The principle whereupon sea-salt acts, in preserving food, may thus be considered as investigated. But it may be asked, why the muriatic acid is so much milder than the septic? To this I reply, that as the unknown radical of that acid attracts oxygene more forcibly than any other known substance, it acts with moderation upon almost every other body; not like the septic, powerfully acting and being itself powerfully acted upon, but, on the contrary, not readily decomposing other bodies, nor being itself readily decomposed. When the base of the muriatic shall become known, certain doubts and difficulties which beset this part of the inquiry will be cleared away, and not until then. This discovery is a grand desideratum in science.

Yet the muriate of soda is not only mingled with food when eaten, but many substances intended for nutriment are sprinkled, pickled, or impregnated with it in the larder and kitchen, before they are served up at table. Sea-salt is preferred for culinary purposes, not because it is the *strongest*, but the most *palatable* and *agreeable* of antiseptics. This may be best understood by shewing what soda can do alone.

If I am not mistaken, the operation of this alkali to overcome the harmful products of putrefaction, is amply supported by the ancient mode of embalming, as practised in Egypt. For HERODOTUS, in describing the process, particularly mentions, among other things, that the bodies WERE SALTED and hid in NITRE for seventy days, (B. ii. cap. 85, 86.) "the use of which was to "dry up all their superfluous and noxious moisture." The Greek historian uses both the word νίτρον and the atticism λίτρον to express the substance used for salting the bodies. Now, it is a settled point, that these words, though translated "nitre," mean not the "salt-petre" of the moderns, but soda, or the basis of sea-salt. This chemical correction, strengthened by the authority of WARBURTON, (3 Divine. Leg. b. 4. § 3.) contending that the body of ISRAEL (Genesis, c. l. 2, 3.) was kept by the embalmers the customary time in nitre, (carbonate of soda) evinces how long ago it was known that the mineral alkali absorbed the septic fluids produced during the corruption of human bodies.

Soda alone then can preserve the flesh of an animal from corruption; and if mere preservation was all that was intended, this alkali would, by itself, answer the purpose; and so would pot-ash.

But there is some quality in the muriatic acid which makes the compound which it forms with soda a far preferable substance to prevent the corruption of meat intended to be eaten.

In order to understand what effect the muriate of soda has, it will be proper to consider what change the piece of meat in the larder was undergoing, which could be arrested by the sea-salt. The flesh of animals (I mean, particularly, the muscular or lean parts) may be considered as verging towards a putrefactive state from the time the fibres lose their irritability, and become rigid. And one of the signs of incipient putrefaction, under circumstances favourable to that process, is sometimes a *sourness* or *production of acidity* in the substance; (4 Fourcroy. Chap. xvi.) and this acidity is inherent in the meat, and quite another thing from fixed air. What I mean is the *septic acid*, which sometimes poisons dissectors, and which, when volatilized into gas, and diffused through the atmosphere, causes violent endemic distempers. When produced, it is formed early in the putrefactive process, and before the whole flesh has undergone total disorganization. But, fortunately for mankind, it is not *always* engendered during the putrefaction, even of those substances which contain its basis, septon. This radical frequently escapes in the form of azotic air, without combining with oxygene at all, and, in such cases, the exact matter of pestilential fluids is not formed.

In cases where the septic acid is formed in salted meat, the muriate of soda is decompounded; and while the alkali attracts the destructive septic acid to itself, it lets go the muriatic. The flesh, in proportion as it becomes impregnated with this new and preserving ingredient, progresses, afterwards, slowly towards decomposition, because it is enveloped with a liquid acting feebly upon it, and upon which it can exert, in its turn, but a feeble action. Hence, when beef, or any other lean meat, is plentifully charged and surrounded with salt, there is enough of soda to neutralize the acid of putrefaction, should any be formed, and there is also a corresponding proportion of the spirit of salt disengaged; from which latter proceeds, in a certain degree, the agreeable smell and pleasant taste of well-salted provisions.

To preserve the flesh of animals, there must, therefore, be not only salt enough in the barrel, but this salt must be applied to every part of the meat, by cutting it into pieces of moderate size, and by rubbing in the salt with a strong hand, as well as by the application of brine or pickle. When too little salt is applied, and provisions are become tainted or corrupt, there is not soda enough to arrest the septic acid, nor a sufficiency of muriatic acid extricated to impregnate and preserve the remainder of the meat. From this septic matter, disengaged with a portion of hydrogene, phosphorus, &c. proceeds the disgusting flavour and sickly nauseating

factor of badly-cured provisions. Thus I account for the production of a large proportion of the pestilential air evolved from stinking *beef*, *hides*, and *fish*, which almost depopulated New-York this year. An alkali could have stayed the whole mischief.

Soda may be thus considered not merely as an antiseptic, but as a substance remarkably friendly, and even necessary to the constitution of the more perfect animals, and especially of man. We are now able to judge a little more clearly and consistently concerning the operation of the various preparations of that alkali upon the alimentary canal. The neutral salts, with this basis, are among the most mild and agreeably-efficacious articles of the shops. The *tartrite of soda* (Rochelle salt) is an elegant remedy, and one which I have employed with much satisfaction to keep the intestines free from noxious matter in our pestilential and other fevers. The *phosphate of soda* (soda phosphorata) is, perhaps, a yet more elegant medicine, readily soluble in water, easy to take, and not difficult to be decompounded in the bowels. The *carbonate of soda*, dissolved in water, and taken into the stomach at the rate of from four to eight grains in two or three hours, is a most gentle and efficacious remedy in dysenteries, and in cholera infantum. If tenesmus is violent, clysters of soda often afford almost instant relief. Laudanum, if necessary, may be joined with it in both cases. Indeed, in the three enumerated forms, soda is capable of attracting the septic acid, which, no doubt, is a frequent exciting cause of dysentery. The *sulphate of soda* is the WONDERFUL SALT OF GLAUBER, and familiar to physicians, and indeed to housekeepers: I shall, therefore, only remark upon it, for the information of chemists, that, contrary to the arrangement in the common tables of elective attractions, Mr. CHAPTAL has shewn, (Memoire sur la Decomposition a Froid, &c. 1 Memoires de Chimie, p. 47.) that the nitrous (septous) acid can decompound the vitriolic salts, that is, those saline compositions which contain the sulphuric acid: and he enumerates by name Glauber's salt, or sulphate of soda, as one of the vitriolic salts capable of being thus decompounded. The *muriate of soda* has likewise, of late, been highly extolled as a valuable anti-dysenteric remedy.

But what signifies it to enlarge on the preferableness of this alkali, in medical prescriptions, to either of the other alkalies? The very name it now bears is SODA, a word synonimous with *pyrosis* and *cardialgia*, and signifying that disorder in the stomach called, by the speakers of the English language, "heart-burn." When I first became acquainted with it, the officinal name was *sal sodæ*, or *salt for the heart-burn*. Latterly, the name "soda" has been transferred from the disease to the substance used in curing it; in which it has been so firmly established since its introduction

into chemical nomenclature, that many of the younger class of modern inquirers have to find out, by searching their dictionaries, that soda had ever any other meaning than the one it at present bears. It will appear from these remarks, that soda was, a considerable time since, thought a good thing for the alimentary canal, and the reason of this was what I have attempted to assign and illustrate.

This theory of bile and sea-salt will be called visionary by some, perhaps the greater part of those who peruse it, especially if they glance at it superficially. To this treatment reformers must submit. Their whole employment is like pulling against the tide, and sometimes beating against the wind too. They should remember the words of the poet, and be meek:

> Truths would you teach, or save a sinking land,
> All fear, none aid you, and few understand.

I am glad to find, by your letter to me from Philadelphia of the 18th instant, that you have finished your reply to Dr. PRIESTLEY. I had before learned from him that you had engaged on the antiphlogistic side. For my own part, I have, as yet, found no reason to make me quit the MIDDLE GROUND I have taken. I, however, wait with impatience for the pamphlet containing your experiments; and, in the meantime, beg you to accept of my best good wishes.

ARTICLE IX.

Sketch of the History of the Weather and Diseases at Hartford, in Connecticut, during the Winter and Spring of 1798; *contained in an Extract of a Letter from Dr.* MASON F. COGSWELL *to the late Dr.* E. H. SMITH.

DEAR SIR, *Hartford, June 7,* 1798.

SINCE the last fall, the inhabitants of this place, and around it, have enjoyed a very unusual degree of health; and, indeed, I believe it has been the same over the whole country, at least as far as I have been able to learn. The weather here has been somewhat peculiar. I will endeavour to sketch some of the most prominent features of the season. Our first winter month (December) was uniformly cold, and most of it severely so; and, as the ground was wholly uncovered with snow, the frost penetrated to an unusual depth in the earth, generally from two to three feet. About the beginning of January the weather softened considerably, and continued mild for several days. Most people supposed the *Indian summer* was approaching, (a week or fortnight of warm weather which generally takes place about the middle of January), but, instead of this, there succeeded to these pleasant days a delightful fall of snow, about a foot in depth, which was bound down by an incrustation of hail, and prevented from blowing in heaps by the winds which followed. From this time till about the middle of March, with alternate pleasant and cold weather, we were highly favoured by one fall of snow succeeding another in such a manner as to furnish us with much more fine sleighing than we usually have in one season. The changes in the weather, however, during this period, were uncommonly great and sudden; at the same time they were very frequent. In many instances it changed, in the course of two or three hours, from temperate to the extremest cold. It is worthy of remark, that in the country above us, which is generally full of snow, there was but very little—not half the quantity, at any rate, that we had here and down on the sea coast. We had no rains, and not sufficient warm weather to destroy our sleighing until the latter end of March. We then had several rains, which, with the warmth of the returning sun, during the middle of the day, carried off the most of our snow. The weather still continued cold. Our storms, which were rain here, were snow but a little distance above us. Within thirty miles above us, the snow, which, dur-

ing the winter, had not been more than three or four inches deep, now fell to the depth of between three or four feet, and so on, up the whole course of Connecticut River. Warm weather soon succeeded, and melted the snow, which poured in torrents into the river, and swelled it to an immense size. We have had no flood for almost half a century that equalled it: about forty-five years since there was one which rather exceeded it. The ground was so frozen that it could receive none of the snow as it melted, and the whole of it flowed into the river. The whole of that part of the town east of Market-street was overflowed. Nearly a fortnight I visited my patients in that quarter of the town in a boat, and, in many instances, stepped from my boat into their chamber windows. Several dwelling houses were swept from their foundations, and many of the out-houses were upset, and carried down the stream. This freshet was earlier, by about a fortnight or three weeks, than is usual in the spring. The waters soon subsided from the meadows, but the banks of the river remained full for a long time, by reason of frequent and heavy showers which fell in April; during which time our meadows were mostly planted, and vegetation had considerably advanced. About the beginning of May the rain fell in deluges, more like the West-India rains than those which are common to our climate, and continued until the banks of the river were again overflowed, and the flood rose to a height little inferior to the first. Much more damage was done by it than by the first, as it was sudden, and every body was unprepared for it. The meadows remained covered with the water so long, that in the lowest parts of them every species of vegetation was completely killed; and there has since issued from those vallies an intolerable stench; but the weather, since the subsiding of the waters, has been very fine, and the progress of vegetation uncommonly rapid. It is, probably, owing to this circumstance, and the admixture of the noxious effluvia which were extricated by the heat of the sun, with pure atmospheric air, that they have been hitherto entirely harmless, and I have no doubt they will remain so.

Had a circumstance of this nature happened in the fall, when vegetation was on the decline, and other causes existing which commonly do exist at that season of the year, favourable to the production and propagation of contagion, I have no doubt we should have it in our power to *boast* of as pure a yellow fever as you ever had in New-York or Philadelphia. From the very frequent and sudden changes of the weather, through the whole of the winter and spring, we might reasonably have expected that catarrhal and pneumonic complaints would have been very frequent; but it was far otherwise; they were less prevalent than in ordinary seasons. In November and December we had several

strongly marked pleurisies, which readily yielded to the usual remedies. Sometime in the fall the measles broke out in a family by the water side, which were communicated to them by a transient person; but in no instance was it communicated from them, although the children visited their school as usual until they were taken sick: two other cases existed more than two months after, and at a considerable distance from the other family, both totally separate from each other, without the most distant conjecture from what source they could receive the contagion. From January to the present time the chicken-pox and hooping-cough have been scattered about town in a manner hardly to deserve the appellation of an epidemic, and so mild in their character that they seldom required the aid of a physician. In the months of February and March we had several inflammatory cholics, which terminated in tedious bilious remittents. These, with a few occasional rheumatisms, catarrhal affections, quinsies, glandular swellings around the throat and ears, opthalmies, &c. &c. have constituted the principal complaints which have prevailed here for several months past. In short, the description given by Dr. Rush, in his third vol. of the diseases which prevailed in Philadelphia during the spring preceding the fatal fall of 1793, with a few exceptions, would exactly apply in the present instance: and although we have enjoyed the preceding calm, the terrible tempest, I earnestly hope, will not arrive, or pass by us without injury. I would just remark, that the most characteristic feature in all our complaints, with scarcely an exception, has been inflammatory, and that the depleting remedies, in a greater or less degree, have been necessary for their removal. The bark has almost lost its character with us, there being but a few patients, even in a state of convalescence, who will bear it to advantage. I have prescribed it, in many instances, within a year or two past, where the fever had entirely subsided, and the appetite was beginning to return, when the whole train of unpleasant symptoms immediately returned, and I was obliged to desist from its use. Perhaps, upon Sydenham's revolutionary plan, the season may soon return when a different general diathesis may require a different class of remedies, and this neglected catholicon may assume its former elevated rank in the materia medica.

Most sincerely
I am your friend,

MASON F. COGSWELL.

REVIEW.

ART. I. *Letters from the Health-Office, submitted to the Common Council of the City of New-York.* By *Richard Bayley.* New-York. *Furman.* 8vo. pp. 100. 1798.

THIS is a publication of certain correspondence of the Health-office of the city of New-York, during the years 1796, 1797, and 1798; to which is added, a letter from the Health-officer, dated December 4, 1798, to the Common Council, wherein he endeavours to assign reasons wherefore the pestilential disease of 1798 was more generally prevalent throughout the city than in 1795, 1796, or 1797.

Though this is a local pamphlet, the subjects treated of are of a very general and extensive nature, and peculiarly interesting to the maritime parts of the United States. It exhibits not only an account of the industrious and well-directed labours of the Board of Health, to diminish the causes, frequency and violence of pestilential distempers, but displays a great variety of facts well worthy of public attention, concerning their origin and progress. And what is true of New-York is, under equal circumstances, applicable to any other place.

The correspondence in 1796 contains, in our judgment, evidence enough of *local* causes to excite the distemper in the south-west part of the city that year. These were, "the accumulation "of every species of filth and perishable matter on the low new-"made grounds on the south side of the city, and the abominable "custom of filling up slips and docks with similar materials." For the most interesting pieces of this part of the correspondence, see the first article of our appendix to vol. ii. No. 1.

A considerable part of the correspondence of 1797 relates to the nuisances, in various parts of the city, which the exertions of the preceding year had not been able to remove. The list of spots emitting, occasionally, fœtid and sickly vapours is long and particular. And it is reduced to a certainty, that there is a connection, apparently of cause and effect, between such exhalations and pestilential disorders. The removal, therefore, of such corrupting substances as excite these complaints is an important branch of police in all thickly-settled situations. In the course of this year, experience at the house for the reception of the sick on Bedlow's Island, evinced (p. 67.) the non-contagious nature of yellow fever, and the complete dominion over the exciting causes

of it, in well-situated and well-regulated hospitals. Under such circumstances, the sickness is not communicable by man to man; since nurses, attendants, and friends of the deceased, escape without being infected. Of this, the experiments both on Bedlow's Island and at Bellevue, afford striking proof.

That part of the correspondence which refers to the year 1798 is chiefly directed to the sewers, the county-jail, the side-walks, the slips, lots lower than the level of the streets, water-lots built upon without having been filled up, and paving the streets generally. To all these objects the commissioners have looked with a vigilant eye. Large quantities of putrefying provisions gave them great trouble, and contributed exceedingly to the mass of pestilential air.

We cannot conclude this account better than by inserting an instructive extract from the Health-officer's last letter to the Corporation of the city of New-York:

"In addition to the facts which are contained in the correspondence between the Health Commissioners and the Common Council for the year 1798, I shall offer to your consideration a few remarks upon the origin and progress of the pestilential disease which has lately prevailed in this city; and, in order to corroborate what I may advance, I shall, in the first place, take a retrospect of events which have annually taken place in this city during the warm months since the year 1795.

"According to the records of the Health-office, the yellow fever appeared in 1796 at Whitehall, at the foot of Pine-street, at Burling-slip, and in the neighbourhood of Roosevelt-street Sewer.

"In 1797, between Coenties and the Old-slip, in Front-street, at the Fly-market in several instances, in Fletcher-street, at Burling-slip, in Water-street, adjoining Roosevelt-street sewer, in George-street, and at the foot of Pine-street.

"In 1798 the disease first appeared about midway between Coenties and the Old-slip, in Front-street, between the 1st and 7th of August. On the 7th of August about twenty-three were reported sick to the Health-office. From that period several others sickened, and of the whole number one died. By the 26th of August the complaint had disappeared in that quarter, in consequence of the measures taken to remove the cause, by covering the offensive lots with clean, wholesome earth.

"On the the 12th of August it appeared at No. 283 Water-street, in the case of Mr. Taylor, in an old broken building, on an unfinished lot at the foot of Dover-street, in which eleven persons died early in 1795, and which has since been repeatedly represented as a nuisance.

"August 12th, also, the disease appeared in the case of John Henderson, corner of James-street and Batavia-lane. On all sides

his residence, which was a small crowded building, there were sunken lots in an unfinished state.

"Again, on August 12th, the disease appeared in William Whitlock, cardmaker, No. 51 Cherry-street. In the rear, and to the south of his residence, the lots are very generally below the level of the streets, and without drains.

"August 13th. Murdock M'Lean, Bruce's wharf, was seized, where the disease has regularly made its appearance every warm season since the year 1795.

"The first arrival of sick in this harbour (to the knowledge of the Health-office) from Philadelphia, was on the 13th of August, in the New-York and Philadelphia Packet. The captain died on the passage; the mate was sick, and was sent to Bellevue.

"August 17. Thomas Collard sickened in Banker-street.
18. Nehemiah Fowler — John do.
20. — Fletcher do.
21. R. Whitmore — George do.
22. A. Sharpless, corner of John and Cliff streets.

"From the preceding statement, the yellow fever made its appearance in different parts of the city on the same day; and, in the course of six or eight days, in different streets, remote from one another.

"On the 8th of August, the mercury in Farenheit's thermometer, at an elevation of forty feet above the ground, and in the shade, at two P. M. stood at 91 degrees.

"On the 9th, 96
10th, 90
11th, 89
12th, 86
13th, 83*

"On the morning of the 14th the heaviest rain fell of any time during the year. It began at five A. M. and continued, without intermission, till nine. Numerous cellars, particularly those in the low parts of the city, were filled with water. Lispenard's meadow, which may be considered as within the limits of the city, was entirely overflowed. In six days it had not subsided above ten inches; and the water did not pass off till a large drain was opened for that purpose, by order of the Common Council.

"* The higheſt to which the mercury roſe in July, 1795, was 83 deg.

Auguſt,	93
July, 1796,	88
Auguſt,	89
July, 1797,	90
Auguſt,	82
July, 1798,	94
Auguſt,	96

"After the immense fall of rain on the 14th, the thermometer, which had fallen on that day to 78, rose

On the 15th, to	82 degrees.
16th,	85
17th,	90
18th,	90

"The sudden and great increase of heat immediately after the violent rain, appeared to have a proportionate influence in producing fever. Between that period and the 22d of August, upwards of twenty persons in Cliff-street were seized with slight indispositions, which they attributed to sleeping with open windows during the preceding hot and moist weather, but which appeared rather as the forerunner of yellow fever; for not only the persons thus indisposed, but a number of others in the same street, had that disease in the course of a few days.

"From this period the disease became more general; but its fatality was principally felt in Cliff-street and its neighbourhood, at Catharine-slip, in Water-street, and on the unfinished grounds in the southern part of the city.

"Now, having seen that the yellow fever has made its appearance in New-York every year, for several years past, but has prevailed in very different degrees, it becomes a matter of great importance to determine, why the disease was so generally prevalent on the low new-made grounds in this city in 1795, whilst it was scarcely felt in the more elevated situations; why, in 1796 and 1797, its appearance was limitted to particular spots; and why, in 1798, it not only prevailed on all the new-made grounds, but also in parts of the city which had before been exempted from the disease.

"To answer these questions in such manner as to prove satisfactory to every one, might be a very difficult task. I shall, however, offer some reasons which may tend to shew why the fever was more prevalent this year than in the preceding years.

"It is well ascertained, that in the year 1795 there was an unusual degree of heat and moisture in the atmosphere during the warmer months—that the thermometer was considerably higher than in 1796 and 1797, but that in 1798 the heat greatly exceeded that of 1795.

"Now, as heat and moisture are powerful agents in *producing* pestilential diseases, so must the same causes necessarily promote the *extension of* those diseases.

"In the year 1798 there were, besides, local causes of fever in this city, which did not exist in the other seasons, and which, cooperating with the weather, served to extend the disease beyond the limits to which it would probably have been otherwise confined. I have reference to the immense quantities of spoiled beef, fish, and other articles of a perishable nature, which were stored

in different parts of this city. The noxious exhalations arising from these sources, in my apprehension, was a great cause why the disease arose, and raged with great violence, in particular situations. And when we consider the sudden appearance of the fever on Golden-hill and in Cliff-street, and the great number which sickened nearly at the same time, there is great reason to believe this opinion well founded.

"About the 20th of August a report was made to the Health-office, that great quantities of spoiled beef were stored in Pearl-street, between Burling and Beekman slips. The stench which issued from some of the cellars in this situation was so considerable as to prove very offensive to those who passed by, and became a subject of general observation. Letters, in consequence, from the Health-office, were addressed to the owners of provisions in that quarter, enjoining them to have the beef examined, and to have such as was spoiled sent out of the city. Instead, however, of adopting this plan, the beef was brought from the cellars into the street, the barrels opened, and the putrid pickle thrown into the gutters. In some instances the examination was made in the cellars, and the pickle disposed of in the same manner. The gutters which conveyed away this putrid pickle led to Burling-slip sewer.

"The relative situation of this sewer and Cliff-street is such, that the southerly and south-easterly winds force a current of air through the sewer, carrying with it the exhalations arising from the noxious matters collected together in that place, and having a direction to pass more immediately up Golden-hill, and into Cliff-street; and every person in that neighbourhood with whom I have conversed, agrees as to the offensive smell of the air previous to the appearance of the fever.

"On the 20th of August, the wind, which had been blowing from the north and west some days previous, shifted to the south-east, and continued to blow from that quarter for some time. In forty-eight hours after this, there was scarcely a house in Pearl-street, near where the spoiled provisions were stored, in the lower end of John-street, and in Cliff-street, which did not contain sick.

"The sudden appearance of fever in this part of the city, and the great number which were affected in so short a time proves the local nature of the cause; and to the one which I have just mentioned I have no hesitation in ascribing all the effects which were experienced.

"If what we have alledged be admitted sufficient to explain the appearance of fever which took place in Cliff-street, &c. we have made some advances towards accounting for the general prevalence of the disease in 1798.

"But, gentlemen, we have further to remark a particular difference in the warm seasons of 1798 and 1795.

"In 1795 the weather was warm and moist, but there was but very little rain.

"In 1798 the weather was not only much warmer, but was accompanied with sudden and heavy rains.

"Immediately after the rains, the public papers teemed with addresses to the citizens, entreating them to empty their cellars of the water which had collected in them, or the most fatal effects would be felt from neglect or inattention to this circumstance. —It is not my intention to dispute the opinion advanced by these writers. But, if the production of disease was to be apprehended from the lodgment of water in places where the sun's rays never enter, what effects were to be expected from the ponding of water in those numerous lots and yards within this city which are several feet below the level of the streets, containing dead animal and vegetable matters, and to which the rays of the sun have full access? I wish you, gentlemen, to reflect seriously upon this comparison, and believe, that whilst those sunken, undrained lots are suffered to remain in their present state, unless causes cease to produce their effects, diseases must inevitably result."

ART. II. *Medical Inquiries and Observations, &c.* Observations upon the Nature and Cure of the Gout. By *Benjamin Rush, M. D. &c.*

[*Continued from page* 191.]

SO much has been offered to the public concerning the gout, by various authors, and at different times, that, if the actual developement of the disease had kept pace with the exertions made for this purpose, the subject might be now supposed to be nearly exhausted. On the contrary, the unsuccessful treatment of it has been long the reproach of medical imbecility. And whoever can throw any new light on this disease, he will perform an acceptable service to that large and respectable class of society who are subjected to its tortures.

The second part of the volume now before us is devoted to this difficult and important subject.

The author begins his observations upon the gout by delivering the following preliminary propositions: That it is a disease of the whole system—that it is a primary disease only of the solids—that it affects most frequently persons of a sanguineous temperament, sometimes the nervous and phlegmatic, the idle and luxu-

rious rather than the temperate and laborious, and women as often as men, though commonly under feebler forms of morbid action, and not so often in their feet and limbs—that its hereditary quality depends upon the propagation of a similar temperament from father to son—and that it is always induced by general predisposing direct or indirect debility.

The remote causes of the gout which induce this debility, are indolence, great bodily labour, long protracted bodily exercise, intemperance in eating, and in venery, acid aliments and drinks, strong tea and coffee, public and domestic vexation, the violent or long continued exercise of the understanding, imagination and passions, in study, business or pleasure; and, lastly, the use of ardent and fermented liquors. The exciting causes of this disease are frequently a greater degree or a sudden application of the remote and predisposing causes; to which may be added sudden inanition from bleeding, purging, vomiting and fasting; also cold, the debility left by the crisis of a fever, and all these aided by the additional debility induced upon the system by sleep. And the proximate cause is morbid excitement, accompanied with irregular action, or the absence of all action from the force of stimulus.

The author next proceeds to enumerate the symptoms of the gout, as they appear in the ligaments, the blood-vessels, the viscera, the nervous system, the alimentary canal, the lymphatics, the skin and the bones.

The ligaments which connect the bones are the seats of what is called a legitimate or true gout. They are affected with pain, swelling and inflammation. In this respect there is an entire sameness of gout and rheumatism.

In the arterial system the gout produces fever. This fever appears not only in the increased force or frequency of the pulse, but in morbid affections of all the viscera. It puts on all the different grades of fever, from the malignity of the plague to the mildness of a common intermittent.

The gout affects most of the viscera. In the brain it produces head-ach, vertigo, coma, apoplexy and palsy. In the lungs it produces pneumonia vera, notha, asthma, hæmoptysis, pulmonary consumption, and a short hecking cough. In the throat it produces inflammatory angina. It affects the kidneys with inflammation, strangury, diabetes and calculi. But of all the viscera, the liver suffers most from the gout. It produces in it inflammation, suppuration, melæna, schirrus, gall-stones, jaundice, and an habitually increased secretion and excretion of bile.

Sometimes this disease affects the arterial and nervous system *jointly*, producing in the *brain* coma, vertigo, apoplexy, palsy, loss of memory, and madness; and, in the *nerves*, hysteria, hypochondriasis, and syncope. Sometimes it affects the brain and

nerves exclusively, without producing the least morbid action in the blood-vessels. The muscles are sometimes affected with spasm, with general and partial convulsions, and, lastly, with great pain. The angina pectoris, or a sudden inability to breathe after climbing a hill, or a pair of stairs, and after a long walk has been known to be a sympton of this disease.

The gout affects the alimentary canal from the stomach to the rectum. Flatulency, sickness, indigestion, pain, or vomiting, usually usher in a fit of the disease. Sick head-ach and dyspepsia are often the effects of this disease, concentrated in the stomach. The author asserts he has seen a case in which the gout, by retreating to this viscus, produced the same burning sensation which is felt in the yellow fever. The patient who was the subject of this symptom died two days afterwards with a black vomiting. Cholic, dysentery, diarrhœa, piles, and a troublesome itching in the anus, are often produced by this disease.

This disease also affects the glands and lymphatics. It has been known to produce a ptyalism and a bubo in the groin. The scrophula, and all the various forms of dropsy, have been observed as the effects of its disposition to attack the lymphatic system.

Cases of the gout affecting the skin have been often recorded. Erysipelas, gangrene, and petechiæ, are the acute—tetters and running sores the usual chronic forms in which it invades this part.

Even the bones are not exempted from the ravages of the gout. The bones of the hands and feet have been sometimes dislocated by it; and one instance occurred of its dislocating the thigh bone.

In the next place the author proceeds to treat of the method of cure. The remedies for the gout naturally divide themselves into the following heads: 1. Such as are proper in its approaching or forming state: 2. Such as are proper in *violent* morbid actions in the blood-vessels and viscera: 3. Such as are proper in a *feeble* morbid action in the same parts of the body: 4. Such as are proper to relieve certain local symptoms not accompanied by general morbid action: and, 5. Such as are proper to prevent its recurrence, or to eradicate it from the system.

1. The symptoms of an approaching fit of the gout are languor, dulness, doziness, giddiness, wakefulness, or sleep disturbed by vivid dreams, a dryness, and sometimes a coldness, numbness, and prickling in the feet and legs, occasional chills, acidity and flatulency in the stomach, with an increased, a weak or a defective appetite. During the existence of these symptoms, the disease may be easily prevented by the loss of a few ounces of blood, or by a gentle dose of physic, and afterwards by bathing the feet in warm water, by a few drops of the spirit of hartshorn, a draught of wine-

hey, or a dose of an opiate. To these remedies, it is conceived, an emetic might be very properly added, as the affection of the stomach is so steadily observed at the approach of the disease, and as the analogy of fever would strictly warrant the practice.

2. Among the remedies proper in cases of great morbid action in the blood-vessels and viscera, our author chiefly relies upon blood-letting. He combats, with decisive force, the objections to this remedy, urged on the ground of the gout being a disease of debility, and that bleeding disposes to more frequent returns of it. He states the advantages of it to be the removal or lessening of pain—the preventing of congestion and effusion in the more important viscera—the preventing of the premature wearing out of the system and the shortening of the duration of the fit. Among the remedies of this head he also enumerates cathartics, emetics, nitre, cool or cold air, and sometimes cold water applied to the inflamed part, the antiphlogistic regimen with respect to diet, blisters, and the operation of fear and terror. Cautions are suggested with respect to the use of sweating, opium, and several local applications. Blisters and caustics, applied to the part affected, are much commended. Molasses, applied to the inflamed or painful limb, is much commended. The early exercise of the lower limbs, by walking, is also particularly enjoined.

3. The author next enumerates the remedies proper in that state of the gout in which a *feeble* morbid action takes place in the blood-vessels and viscera. They are opium, Madeira or sherry wine, porter, ardent spirits in the form of grog or toddy, æther, volatile alkali, aromatics, oil of amber, Peruvian bark, the warm bath, mercury given to the extent of ptyalism, and the local application of frictions with brandy and volatile liniment, blisters and stimulating cataplasms.

4. The local symptoms of the gout are directed to be treated upon the common principles which are to be found in practical books.

5. The means of preventing the return of that state of the disease which is accompanied with violent action, are temperance, moderate labour and exercise, the avoiding of cold, moderation in the exercise of the understanding and passions, moderation in venereal indulgences, the avoiding of costiveness, and a stricter abstinence, as well as an attention to occasional evacuations by bleeding, &c. in the spring and autumn.

In the last place the author mentions the remedies proper to obviate a return of that state of gout which is attended by a *feeble* morbid action in the blood-vessels and viscera. These are a gently stimulating diet, the use of chalybeate medicines, the volatile tincture of guiacum, the uniform application of warmth, the warm bath in winter, and the temperate or cold bath in summer,

exercise, the avoiding of costiveness, the constant and agreeable employment of the understanding and passions, but without fatigue of body or mind, and, lastly, migration to a warmer climate.

We have thus delivered an outline of this valuable practical performance; in which the learned author has exploded much pernicious error, and introduced, illustrated, and forcibly enjoined, a great deal of important truth. The perusal, however, of the work itself will afford a gratification which no reader can expect from this naked and imperfect sketch.

The doctrine of the secondary nature of the gout, when it affects the extremities under an inflammatory form, does not seem to be recognized by our author. The primary affection of the stomach or the liver, and its appendages, appears to be strongly supported by many phenomena which usher in the disease. And it is conceived, that the admission of this principle, so far from opposing, would serve greatly to fortify and illustrate many important positions in this treatise.

(To be continued.)

ART. III. *Memoirs of the Yellow Fever, which appeared in Philadelphia, and other Parts of the United States of America, in the Summer and Autumn of the present Year,* (1798.) *&c.* By *William Currie, S. C. M. P. &c.* Philadelphia. *Dobson.* 8vo. pp. 145.

THE author of this piece is the same whose Observations on Bilious Fevers were reviewed in Art. iii. of the first number of the present volume. Our readers will recollect there were several points in that performance, on which we differed from this gentleman. And we really hoped, by this time, the recent experience of the city in which he dwells might have wrought that conversion which the forcible and manly reasoning of Mr. Webster could not effect.

Mr. Jones, the President of the Board of Health, informs the Governor of the State of Pennsylvania, that the "law in respect "to quarantine has been construed and executed in the strictest "sense," and "those objects which have been pointed to with "the greatest confidence as the foreign source of the disease, on "investigation, afford no such proof!" and Dr. Physick, President of the Academy of Medicine, certifies that the distemper broke out and destroyed several persons before the West-India vessels arrived: and yet, notwithstanding all this, Dr. Currie declares and insists the distemper was imported into Philadelphia, and propagated by contagion! Amidst such contradictory testimony, the

impartial public cannot hesitate in determining to which side the weight of evidence inclines.

The work before us is a sort of diary, consisting chiefly of the ordinary observations on the weather, and paragraphs and other pieces from the newspapers. Of such a medley it is difficult to make either abstract or analysis. This, however, is not matter of much regret, as our readers will judge from the following declaration of Dr. Currie, concerning the distemper, *the contagious nature of which*, says he, p. 139. *is acknowledged by all, excepting a few persons that are distinguished for nothing but the singularity of their opinions, and a pertinacious adherence to a tenet which, both by the illustrations of reasoning, and the common sense of their fellow-citizens, has been declared absurd and untenable.* And who are these few? The great body of the inhabitants of New-York, New-London, Providence, and Boston, among whom no dispute exists about the production of its exciting cause in their respective places, from substances before their eyes. It afflicts us to observe such groundless assertions repeated, from year to year, by the publisher of these memoirs. It would become him to remember that other persons possess reasoning powers and understanding as well as himself. He should be more liberal and charitable. Dr. Currie has not, that we know, engrossed or monopolized all the medical knowledge and sagacity of America. Unmannerly expressions are not calculated to gain him proselytes.

Concerning its contagious quality, we recommend to Dr. Currie the following fact: Seven men, belonging to the Alms-house of the City of New-York, were employed, during the whole of the sickly season of 1798, in putting the persons dead of the plague into coffins, and, in the course of their service, they handled upwards of five hundred corpses, in different stages of putrefaction. Although these men were much incommoded by the pestilential quality of the air in the rooms they entered, and frequently were obliged to vomit, not one of them was so much indisposed during the whole season as to discontinue his employment. And neither in the state hospital, nor city hospital of New-York, did the disease shew any contagious quality.

We should offer nothing more on this extraordinary production, did we not deem it our duty to bear witness against several other dogmas of the author.

To support his notion of contagion, he has recourse to a vitiated secretion; and affirms, p. 106. that "the excretions occa-"sion a similar fever when taken into the body." We do not know how the secretions of Dr. Currie's patients went on; but we can assure him that exhalations from corrupting beef and fish have excited sickness in New-York as malignant and deadly as any which has occurred, and deriving no peculiar qualities, that

we believe, from the vascular action of the bullock or the herring. As far as we can discern, there is no evidence of such morbid secretion, but the pestilential matter appears to be formed, in every instance, *after secretion*, and by a process truly chemical, and wholly independent of animated motion or vital energy. And we would submit to him, whether the difference between *common* and *specific* contagion does not consist herein, that the former is produced *without*, the latter *by*, secretion?

The author passes a stricture (ibid.) upon Dr. Mitchill's theory of pestilence, and seems to think he has explained it away. Dr. Currie, when he affirms that the corrupting flesh of animals emits sulphurated hydrogenous gas and azotic air, affirms what *often* happens. But this does not *always* take place. Nor, if it did, has Dr. Currie mentioned *all* the fluids formed during the putrefactive process. If he intended to be correct, why did he not mention the *carbonic* and *septic* acids, two of the most common results of animal disorganization in hot weather? We have yet to learn, that the production of sulphurated, and, we will add, phosphorated and carbonated hydrogene air, is incompatible with the union of a portion of the septon (azote) of a putrefying carcase with certain proportions of oxygene and caloric. We are surprized that the author should prostitute the word "demonstrate" as he does. Before he publishes criticisms again, we recommend to him a better acquaintance with the subject.

The zeal and industry of Dr. Currie to prove the disease imported into Philadelphia this year, are fruitlessly employed, for the above-mentioned reasons: in addition to which we can inform him, that the story of its introduction into New-Haven in 1794, from the West-Indies, is wholly refuted and done away, as he may see in the report of the committee of the Medical Society of New-York, appointed to inquire into the origin, cause and prevention of their annual endemic distempers. The same, we have reason to think, would be true of all the other pretended instances of importation and contagion, if minutely inquired into.

Dr. Currie's manner of expression puts us in mind of Lord PETER's way of reasoning with MARTIN and JACK, in the *Tale of a Tub*. But we forbear to enlarge, as we think it time to dismiss from further consideration, a performance which has little to recommend it, either of the disentangling and careful spirit of investigation, or the mild and dignified temper of philosophy.

ART. IV. *Transactions of the Society instituted in the State of New-York, for the Promotion of Agriculture, Arts and Manufactures.* Part iii. Albany. *Loring Andrews.* 1798. 4to. pp. 130.

EVERY friend of our country will be gratified to observe the evidence which this publication exhibits of the attention of this society to the important objects for which it was instituted. It is known to all how deeply the prosperity and independence of the United States are concerned in the improvement of agriculture, arts and manufactures. And we flatter ourselves that this institution, composed of some of our most distinguished citizens, and enjoying the patronage and assistance of the government, will vigorously persevere in the present course of exertion, which is equally reputable to itself and honourable to the State.

This work contains a variety of communications, which we shall briefly notice in order.

Article 1. Address delivered before the society at New-York, on the 8th of November, 1796. By James Kent, LL. D.

A considerable part of this animated and elegant discourse is employed in exhibiting the great extent and variety of natural advantages, possessed by the State of New-York, for improving agriculture, arts and manufactures, and, consequently, the wealth and prosperity of its citizens. The felicities of the civil and political condition of the people, as conducive to all the objects of public good, are pourtrayed in a strain of warm and enlightened patriotism. The numerous improvements, of different kinds, which have been accomplished in the United States, and more particularly in the State of New-York, since the æra of the revolutionary war, are rapidly sketched. The example of some of the best cultivated parts of Europe is held up, in several particulars, as a model of imitation, and their population, opulence and resources, stated as incitements to similar exertions in this country. And, finally, a number of interesting objects and plans of improvement are forcibly and eloquently recommended to public attention.

Art. 2. Address to the society, delivered at the city of Albany, on the 7th of February, 1798. By Samuel L. Mitchill.

In this discourse Professor Mitchill presents a cursory view of the transactions under the direction and authority of the society since the preceding meeting. He traces the progress of discovery and scientific arrangement on the subject of manures; and he explains the production of those aërial fluids, which, according to circumstances, operate either as poisons or manures. Upon the principles thus laid down, he demonstrates an intimate and important connection between meteorology, farming and medicine.

Art. 3. Experiments and observations on the culture of white thorn for hedges. By Jonathan N. Havens, Esq.

Among all the various kinds of trees which have been used or thought of for a hedge, Mr. Havens thinks none has been more generally approved of than the white thorn, or hawthorn, as it has been usually termed by the writers on agriculture.

There are three species of the white thorn growing in this country; two of these are native, and the other is believed to have been imported from Great-Britain. Mr. Havens distinguishes the two American species by the names of the *broad-leafed* and the *narrow-leafed*, of which he considers the latter as preferable to all others.

Great difficulty is supposed to attend the propagation of the white thorn. After some experiments, Mr. Havens is of opinion that it may be propagated by gathering the haws as soon as they become ripe in the autumn, and burying them in the ground, below the frost, letting them remain there until the second spring after being buried, then taking them up, and planting them in a nursery. He thinks the haws should be placed in a wet situation.

Art. 4. Observations on manures. By Ezra L'Hommedieu.

In this paper the author treats of the use of fish as a manure—of the manure to be procured by preparing a hole of proper extent and depth, behind the kitchens of farm-houses, to be filled with turf or dirt, and to serve as the receptacle of all the offals and filth from the house, &c.—of the manure procured by annually removing and replacing the loose earth under stables, cow-houses, barns, &c.—of the manure procured by burning peat or turf on the soil—of the manure formed from burnt clay—of the substitute for manure in a careful and minute pulverization of the soil by repeated harrowing—of the best method of obtaining manure by yarding cattle, &c.—and of the advantages of manuring fruit trees by fish, &c.

Art. 5. On the feeding of hogs to advantage. By the same.

The author supposes a saving of one tenth part may be made in the feeding of hogs, by soaking the corn used for this purpose; and he asserts that the same preparation will equally improve that article when intended as a food for horses.

Art. 6. On septon (azote) and its compounds, as they operate on plants as food, and on animals as poison: intended as a supplement to Mr. Kirwan's pamphlet on manures. In a letter to the Rev. Dr. Henry Muhlenberg, of Lancaster, Pennsylvania, from Mr. Mitchill, of New-York, dated October 24, 1796. See Med. Repos. vol. ii. p. 240.

Art. 7. Affinities and relations of septic (nitric) or pestilential fluids to other bodies. In a letter from Dr. Mitchill, F. R. S. E. &c. to Sir John Sinclair, Bart. &c. See the appendix of this number.

Art. 8. On the method of tarring seed corn, to prevent its being destroyed when planted. By James G. Graham, Esq.

The title of this useful paper will sufficiently unfold its object, which is a matter of real importance.

Art. 9. An account of extraordinary crops of corn raised by means of street manure. In a letter from Dr. Mitchill to Mr. Webster. See Med. Repos. vol. i. p. 416.

Art. 10. Method of procuring new varieties of potatoes. By Simeon De Witt.

In this paper is stated the mode of raising potatoes from the seed of what is called the seed-apple, in order to recover them from degeneracy, and to form new varieties. The circumstances of management are ascertained by actual experiment.

Art. 11. On raising potatoes. By Noah Webster, jun. Esq.

Several important directions concerning the management of this inestimable article of food, are briefly and judiciously suggested in this paper.

Art. 12. On the cultivation of the poppy-plant, and the method of procuring opium, &c. By Dr. Shadrach Ricketson. See Med. Repos. vol. i. p. 420.

Art. 13. On the weaning of calves. By Lemuel Clift, Esq.

This is a good economical paper, and interesting to all who keep dairies.

Art. 14. A memoir on the Onondaga salt springs and salt manufactories in the State of New-York. By Benjamin De Witt, M. D.

This memoir is introduced by general observations on the importance of those springs, as an object of natural history, as an object of chemistry, considered in a medical point of view, in a political point of view, and as an object of manufacture.

An accurate description next follows of the situation and general appearances of these salt springs, together with a notice of all the adjacent circumstances, which deserve attention.

The nature and qualities of the water form an important part of this memoir. From half a pint of this water he obtained 551 grains, or about $1\frac{1}{4}$ oz. avoirdupoise, of salt, and 26 grains of calcareous earth (lime); equal to 8816 grains, or 20 oz. and 76 grains of salt to the gallon, and 416 grains, or nearly one oz. of calcareous earth. It contains also a very minute portion of vitriolic (sulphuric) acid, probably united with the fossil alkali, in the form of Glauber's salt, (sulphate of soda.) Hence it appears that the water of these springs holds in solution more than $\frac{1}{5}$th of its weight of salt; whereas sea-water usually contains no more than $\frac{1}{30}$th.

Dr. De Witt's table for ascertaining the quantity of impregnation of all salt waters, merely by comparing their specific gravities

with the known specific gravity of water holding in solution definite proportions of common salt, is very convenient, very judiciously devised, and so far as we recollect, entirely new.

An explicit account of the mode of conducting the salt manufactories next follows; and some ingenious improvements are suggested.

Dr. De Witt calculates, that with the number of kettles now in use at these springs, 70,000 bushels of salt may be annually manufactured.

This memoir contains so much important information, and is drawn up with so much ability and discernment, that we cannot withhold this expression of our warmest approbation.

Art. 15. Result of thermometrical observations for the years 1795 and 1796, made at the city of Albany. By Simeon De Witt.

The observations of which this table is the result, were made from the state of the thermometer at its two extremes within each twenty-four hours. The author properly observes that it is only in this manner that the true mean of the weather can be obtained.

Art. 16. Result of thermometrical observations for the year 1797, made at the city of New-York. By Gardiner Baker. See Med. Repository.

Art. 17. Thermometrical observations made on the North-Western Lakes, from August 4th to Sept. 4th, 1797. By Major C. Swan, paymaster to the Western Army. See Med. Repository, vol. i. p. 526.

METEOROLOGICAL OBSERVATIONS *for October*, 1798, *made in the Cupola of the Exchange, in the City of* New-York.

Days of the Mon.	Thermom. observed at Sun-rise.	2 P. M.	Prevail. winds. S. r.	2 E.	Clear.	Cloudy	Barometer observed at Sun-rise.	2 P. M.
1	51	67	S W	S	2		29 90	29 91
2	63	69		S	1	1	29 98	30 3
3	58	74		S	1	1	30 0	29 92
4	58	72		S	1	1	29 97	29 89
5	57	71	N	N E	2		29 70	29 69
6	61	71	N E	N E		2	29 66	29 58
7	60	59	N E	N E		2	29 50	29 40
8	55	59	N E	N		2	29 37	29 39
9	54	70	N W	N W	2		29 61	29 69
10	59	71		S W		2	29 78	29 80
11	59	68	N E	S W	1	1	29 80	29 87
12	57	62	E	E		2	30 2	30 5
13	47	58	N	N		2	30 12	30 12
14	50	59	N E	N E		2	30 10	30 4
15	48	64	N E	N E	2		29 95	29 90
16	50	66	N W	S W	2		29 84	29 80
17	56	71	N	E	2		29 67	29 75
18	56	76	E	E	2		29 79	29 81
19	51	56	N E	N E		2	29 90	29 88
20	50	57	N E	N E		2	29 80	29 71
21	53	70	N W	N	1	1	29 51	29 45
22	55	70		S	2		29 49	29 45
23	64	64	S W	N W		2	29 20	29 13
24	50	59	N W	N W	2		29 48	29 60
25	50	65	N W		2		29 61	29 60
26	56	72	N W	S W	2		29 58	29 50
27	60	60	S	N W		2	29 55	29 54
28	50	56		S W		2	29 40	29 33
29	36	44	W	W	2		29 55	29 55
30	29	38	W	W	2		29 50	29 34
31	34	40	W	N W	1	1	29 20	29 34

Results of Meteorological Observations for October, 1798.

Mean temperature of the air at sun-rise,	deg. 52½
Do. do. of the do. at 2 P. M.	63
Do. do. of the do. for the whole month,	57
Greatest monthly range between the 18th and 30th,	47
Do. do. in 24 hours, on the 15th,	16

Coldest day the 30th. Warmest day the 9th.

METEOROLOGICAL OBSERVATIONS *for November*, 1798.

Days of the Mon.	Thermom. observed at Sun-rise.	2 P. M.	Prevail. winds. S. r.	2 E.	Clear.	Cloudy	Barometer observed at Sun-rise.	2 P. M.
1	32	35	W	S W	1	1	29 61	29 59
2	32	42	N	N E	1	1	29 35	29 40
3	37	40	N	N W		2	29 44	29 39
4	31	42	W	N W	1	1	29 52	29 51
5	30	37	W	N W	2		29 59	29 70
6	32	48	W	W	2		29 81	29 81
7	32	50	N	var.	2		30 0	30 0
8	36	52	W	W	1	1	29 98	29 88
9	38	53	S W	S W	2		29 72	29 66
10	30	36	N W	N W	2		29 87	29 96
11	30	52	S W	S W	2		30 7	29 89
12	41	47	S W	S W	2		29 15	29 87
13	30	47	S W	S W	2		30 10	29 95
14	42	50	W	var.		2	29 80	29 78
15	50	57	S W	S W		2	29 47	29 29
16	50	56	W	N W			29 31	29 40
17	36	37	N E	E	2		29 75	29 70
18	39	54	N E	var.		2	29 56	29 57
19	42	40	N E	N E		2	29 57	29 46
20	28	27	N	N		2	29 34	29 20
21	22	28	N W	N W	1	1	29 2	29 10
22	26	38	W	S W	2		29 40	29 46
23	28	34	N E	N	2		29 40	29 40
24	27	36	N W	W	2		29 56	29 58
25	26	30	N E	N	2		29 92	30 5
26	26	42	N E	S	2		30 15	30 13
27	33	46	S W	S W	2		30 6	30 0
28	33	47	S W	S W	2		29 83	29 70
29	40	45	S W	W	1	1	29 51	29 50
30	32	47	S W	S W	2		29 50	29 44

Results of Meteorological Observations for November, 1798.

November 17th, ſome diſtant lightning in the evening. On the 18th, ſmoky air, mixed with electric clouds. At night, much thunder and lightning, with heavy ſhowers. On the 19th, ſome thunder, with thick fog at times, and very dark: the wind ſhifting to the north about 10 o'clock, ſuddenly grew cold, and blew a gale all night, attended with ſnow. The gale abated much in the morning of the 20th, but continued to ſnow all day, until near eleven at night; in which time not leſs than eighteen inches of ſnow fell.

METEOROLOGICAL OBSERVATIONS *for December*, 1798.

Days of the Mon.	Thermom. observed at Sun-rise.	Thermom. observed at 2 P. M.	Prevail. winds. S. r.	Prevail. winds. 2 E.	Clear.	Cloudy	Barometer observed at Sun-rise.	Barometer observed at 2 P. M.
1	36	47	N W	W		2	29 52	29 51
2	32	36	E	E		2	29 60	29 50
3	32	42	S W	S W		1	29 21	29 12
4	39	38	W	N W	2		28 94	29 30
5	17	20	N W	W	2		29 54	29 65
6	19	25	S W	S W		2	29 78	29 57
7	20	31	S W		2		29 80	29 80
8	29	35				2	29 70	29 57
9	27	24	N E	N E		2	29 64	29 52
10	14	22	N W	N W	2		29 61	29 62
11	15	22	E	W		2	29 62	29 54
12	15	27	N W	var.	2		29 82	29 80
13	20	36	var.	E	1	1	29 70	29 57
14	37	38	N W	N W	2		29 30	29 58
15	32	28	N W	N W	2		29 70	29 72
16	15	20	N W	N W	2		29 70	29 68
17	20	26	N W	N W	2		29 76	29 80
18	22	32	N W	S W	2		29 67	29 66
19	26	25	N E	N E		2	29 40	29 26
20	22	24	N	N W	2		29 50	29 50
21	17	28	W	N W	2		29 75	29 79
22	21	24	N E	N E		2	29 76	29 64
23	23	25	N	N W	1	1	29 33	29 34
24	24	28	N W	N W	2		29 47	29 50
25	28	29	W	W	2		29 98	30 1
26	33	34	W	W	2		30 10	29 98
27	34	38	W	W	1	1	29 58	29 50
28	28	36	W	W	2		29 56	29 70
29	32	38	N E	N E		2	29 73	29 79
30	30	24	N W	N W	2		29 80	29 81
31	28	36	N W	N W	2		29 83	29 83

A RETURN *of Patients admitted to the Care of the New-York City Dispensary, from the* 1st *of October*, 1798, *to the* 1st *of January*, 1799.

OCTOBER.

DISEASES.	No.	Cured.	Relieved.	Died.	Removed, &c.
Indigestion	1	1			
Bilious Fever	39	34		2	3 Bellev.
Dysentery	2	2			
Pain of the Stomach	1	1			
Pleurisy	1	1			
Hæmorrhage	1	1			
Eruption	2	2			
Ulcer	1	1			
Tumefied Breasts	1				1 und. c.
Typhomania	1				1 Hospi.
Catarrh	1	1			
Luxation	1	1			
Obstructed Menses	1	1			
Worms	1	1			
Rheumatism	1				1 und. c.

Admitted	55				
Cured	47				
Died	2				
Bellevue	3				
Hospital	1				
Under care	2				
	—55				

NOVEMBER.

Indigestion	4	4			
Rheumatism	6	6			
Parturition	2	2			
Sore Legs	2	1	1		
Bilious Fever	17	17			
Dropsy	3	3			
Asthma	2	2			
Contusion	1	1			
Convulsion	2	2			
Luxation	1				1 Hospi.
Diarrhœa	2	2			
Worms	1	1			
Head-ach	2	2			
Mania	1				1 Alms-h
Pneumony	2	2			
Fracture	1	1			
Erysipelas	1	1			
Catarrh	1	1			
Scald Head	1	1			
Dysury	1		1		
Abscess	1	1			
Epistaxis	1	1			
Wound	1	1			

Admitted	56				
Cured	52				
Relieved	2				
Hospital	1				
Alms-H.	1				
	—56				

DECEMBER.

DISEASES.	No.	Cured.	Reliev.	Died.	Removed, &c.	Result.	
Catarrh	1	1				Admitted	35
Palsy	1	1					
Rheumatism	3	3				Cured	30
Burns	2	1			1 und. c.	Relieved	1
Inflammation of Liver	1	1				Died	2
Luxation	1	1				Under care	2
Contusion	3	3					—35
Pneumony	4	4					
Sore Eyes	1	1					
Indigestion	1	1					
Quinzy	1	1					
Pulmonary Consumption	2		1	1			
Calculus	1				1 und. c.		
Whites	1	1					
Diarrhœa	1	1					
Venereal Disease	5	5					
Inflammation of Intestines	1			1			
Nervous Fever	1	1					
Parturition	1	1					
Sore Legs	1	1					
Worm Fever	1	1					
Chronic Cough	1	1					

SUMMARY.

Whole number of Patients admitted into the New-York City Dispensary, from the 1st of October, 1798, to the 1st of January, 1799, 146

Of this number have been *cured*,	129
relieved,	3
have *died*,	4
Removed to the Hospital,	2
Alms-House,	1
to Bellevue,	3
Remaining under care,	4
	146

HUGH M'LEAN.

A TABLE *exhibiting the number of Patients received into the New-York Hospital in each Month—their Diseases, and the event of each Case.*

July, 1798.

DISEASES.	Remain. from laſt Month.	Receiv. this Month.	Cured.	Died.	Dif. dif. and eloped.	Under Care.
MEDICAL.						
Rheumatism	4	4	5			3
Syphilis	15	7	9		1	12
Pneumonia	5		2	1		2
Mania	9	1	2			8
Ascites		1			1	
Gonorrhœa		1				1
Catarrh		1				1
Diarrhœa	1	1	2			
Hysteria	1					1
Typhus Icteroid.		1				1
Typhus Mitt.		1				1
Physconia Splen.	1					1
Scrophula	1					1
Febris Intermit.	1	4	3			2
Erysipelas	1					1
SURGICAL.						
Sore Legs	14	6	4		1	15
Syphilis	11	1	5			7
Frozen Limbs	5		3			2
White Swelling	1					1
Burns	1					1
Cataract	1		1			
Fracture	2			1		1
Tumor	3	1	2			2
Opthalmia	3	1	1			3
Fistula	1	1				2
Contusion	2		1			1
Hydrocele	1		1			
Disordered Spine	1					1
Sphacelus		1				1
Wounds		4			2	2
Cancerous Breast		1				1

Result for July, 1798.

Remaining from last month,	85	
Received this month,	38	
		123
Cured,	41	
Died,	2	
Discharged disorderly,	5	
Under care,	75	
		123

August, 1798.

DISEASES. MEDICAL.	Remain. from laſt Month.	Receiv. this Month.	Cured.	Reliev.	Died.	Dif. diſ. and eloped.	Under Care.
Rheumatism	3	2	2	1			2
Syphilis	12	18	7			1	22
Pneumonia	2		1	1			
Mania	8	1					9
Gonorrhœa	1		1				
Catarrh	1	2	1	1			1
Diarrhœa		2		1			1
Hysteria	1						1
Typhus Icteroid.	1	7	1		3		4
Typhus Mitior	1		1				
Physconia Splen.	1						1
Scrophula	1						1
Febris Intermit.	2	1	1				2
Erysipelas	1			1			
Fistula	1						1
Dropsy		1					1
Opthalmia		2					2
Hepatitis		1			1		
Dysentery		8	1		1		6
Phthisis Pulmona.		1					1
Debility		1	1				
Cholera		1				1	
Paralysis		1		1			
Sore Breast		1	1				
Contusion		1	1				

August continued.

DISEASES. SURGICAL.	Remain. from laſt Month.	Receiv. this Month.	Cured.	Reliev.	Died.	Under Care.
Sore Legs	15	8	5	1		17
Syphilis	7	4	2			9
Frozen Limbs	2	1				3
White Swelling	1					1
Burns	1					1
Fracture	1	2	1		1	1
Tumor	2		1			1
Opthalmia	3	1			1	3
Fistula	2		1	1		
Contusion	1		1			
Disordered Spine	1					1
Schirrus	1		1			
Wounds	2	2	2	1		1
Cancerous Breast	1					1
Hernia		1				1

Result for August, 1798.

Remaining from last month,		76
Received this month,		70
		146
Cured,		33
Relieved,		9
Died,		7
Discharged disorderly,		2
Under care,		95
		146

September, 1798.

DISEASES. MEDICAL.	Remain. from laſt Month.	Receiv. this Month.	Cured.	Died.	Under Care.
Rheumatism	2	3			5
Syphilis	22		9		13
Pneumonia		2	2		
Mania	9	1	3		7
Gonorrhœa		1	1		
Catarrh	1	1	1		1
Diarrhœa	1	5	1		5
Hysteria	1		1		
Typhus Icteroid.	4	18	10		12
Physconia Splen.	1			1	

September continued.

DISEASES.	Remain. from laft Month.	Receiv. this Month.	Cured.	Died.	Remov. to the Alms-H.	Dif. dif. and eloped.	Under Care.
MEDICAL.							
Scrophula	1		1				
Febris Intermit.	2	1	1				2
Fistula	1	1	2				
Dropsy	1			1			
Opthalmia	2		2				
Dysentery	6		6				
Phthisis Pulmona.	1			1			
SURGICAL.							
Sore Legs	17	6	10		2	4	7
Syphilis	9	5	7			2	5
Frozen Limbs	3		1		1		1
White Swelling	1			1			
Burns	1		1				
Fracture	1	2	3				
Opthalmia	3		2				1
Disordered Spine	1			1			
Wounds	1		1				
Cancerous Breast	1		1				
Hernia	1			1			

Result for September, 1798.

Remaining from last month,		94
Received this month,		47
		141
Cured,	66	
Died,	6	
Removed to the Alms-House,	3	
Eloped,	6	
Under care,	60	141

SUMMARY

For July, August, and September, 1798.

Patients remaining under care at the end of the quarter terminating June 30,		88
Patients received in the last three months,		155
		243
Of these have been cured,	144	
relieved,	9	
died,	15	
been removed to the Alms-House,	3	
discharged disorderly and eloped,	13	
There remain under care, October 1,	59	
		243

October, 1798.

DISEASES.	Remain. from laſt Month.	Receiv. this Month.	Cured.	Reliev.	Died.	Diſ. dif. and eloped.	Under Care.
MEDICAL.							
Rheumatism	5	8	3	2		2 Als. h	6
Syphilis	13	6	8			3	8
Pneumonia		3	1	1			1
Mania	7		2				5
Gonorrhœa	1	5	3				3
Catarrh	1	4	4		1		
Typhus Icteroid.	12	14	16		8		2
Febris Intermit.	2		2				
Dropsy		1					1
Phthisis Pulmona.		1			1		
Typhus Mitior		1			1		
Dysentery		3	3				
Diarrhœa	5	3	6				2
SURGICAL.							
Sore Legs	7	8	6				9
Syphilis	5	6	3			1	7
Frozen Limbs	1		1				
Tumors		1					1
Opthalmia	1	1	1				1

Result for October, 1798.

Remaining from last month,	59
Received this month,	64
	—123
Cured,	59
Relieved,	3
Died,	11
Removed to the Alms-House,	2
Discharged disorderly,	4
Under care,	44
	—123

November, 1798.

DISEASES.	Remain. from laſt Month.	Receiv. this Month.	Cured.	Reliev.	Died.	Dif. dif. and eloped.	Under Care.
MEDICAL.							
Rheumatism	6	11	10	2			5
Syphilis	8	14	7			2	13
Pneumonia	1	3	1		1		2
Mania	5						5
Gonorrhœa	2	3	2			1	2
Typhus	1				1		
Febris Intermit.		1	1				
Dropsy	1					1 Als. h.	
Diarrhœa	2	3	2	1			2
Dysentery		3			1		2
Phthisis Pulmona.		1			1		
SURGICAL.							
Sore Legs	9	10	8			2	9
Syphilis	7	5	3			2	7
Tumors	1			1			
Opthalmia	1	1					2

Result for November, 1798.

Remaining from last month,		44
Received this month,		55
		99
Cured,		34
Relieved,		4
Died,		4
Removed to the Alms-House,		1
Discharged disorderly,		7
Under care,		49—99

December, 1798.

DISEASES.	Remain. from laſt Month.	Receiv. this Month.	Cured.	Reliev.	Died.	Dif. dif. and eloped.	Under Care.
MEDICAL.							
Rheumatism	5	13	6	4	1		7
Syphilis	13	8	9			3	9
Pneumonia	2	6	5		1		2
Mania	5	2			1		6
Gonorrhœa	2	5	4			1	2
Typhus		1			1		
Dropsy		1					1
Diarrhœa	2		2				
Dysentery	2	1	2		1		
Phthisis Pulmona.		2			1		1
Pleuritis		4	4				

December continued.

DISEASES. SURGICAL.	Remain. from laſt Month.	Receiv. this Month.	Cured.	Dif. dif. and eloped.	Under Care.
Sore Legs	9	4	3	1	9
Syphilis	7	6	2		11
Fracture		3			3
Opthalmia	2	1	1	1	1
Contusion		2	1		1
Tumors		1			1

Result for December, 1798.

Remaining from last month,		49
Received this month,		60
		—109
Cured,		39
Relieved,		4
Died,		6
Discharged disorderly,		6
Under care,		54
		—109

SUMMARY

For October, November, and December, 1798.

Patients remaining under care at the end of the quarter terminating December 31,		53
Patients received within the last three months,		176
		—229
Of these have been cured,		139
relieved,		10
have died,		21
removed to the Alms-House,		5
there remain under care, January 1, 1799,		54
		—229

General Result for the second half-year of 1798.

Number of patients under care on the 1st of July, 1798,	85
Number received within the second half-year of 1798,	331
	—416
Cured,	270
Relieved,	19
Died,	35
Removed to the Alms-House,	8
Discharged disorderly and eloped,	31
Under care,	53
	—416

SUMMARY

For the whole year of 1798.

Number of patients under care from last year, January, 1798,		90
Number received within the present year,		580
		670
Of these have been cured,		461
relieved,		35
died,		55
been removed to the Alms-House,		9
discharged disorderly,		34
by desire,		8
eloped,		14
Incurable,		1
Under care, January 1, 1799,		53
		670

MEDICAL & PHILOSOPHICAL NEWS.

DOMESTIC.

IN our last number, the intelligence concerning the pestilential epidemic of the summer and autumn of 1798 was unavoidably imperfect. Even to the present time, notwithstanding much solicitude and exertion on this subject, we have not succeeded in obtaining satisfactory details from all the seats of pestilence in the United States. Such, however, as have come to hand we now proceed to lay before the reader as distinctly as our materials will allow.

From Portsmouth (New-Hampshire) we have yet received nothing but vague reports.

At Salem (Massachusetts) there was a general prevalence of health at that season; though several cases of yellow fever, and some of them fatal ones, occurred. Dr. Oliver very judiciously inclines to the belief, that the exemption of this town from the ravages of yellow fever, is owing, 1st, to the remarkably clean state of the town; and, 2dly, to the houses being placed at such distances as to admit of free ventilation. It was observable that the yellow fever had a *spontaneous* origin in two different places of the town, where putrid matters had been suffered to accumulate, and proved fatal to two persons in different families; these unclean spots forming exceptions to the generally purified state of the town.

From a very respectable source we are informed that the disease made its first appearance in Boston on the 21st of June. In the family attacked at this early period, two persons died; one on the third, the other on the second or third day of the disease. Two others recovered with much difficulty. After the lapse of a month, on the 21st of July, the disease again appeared near the former place. Seven persons in this neighbourhood were seized within a short time, and all died. For two or three weeks all the cases which occurred were of persons residing at or frequenting this place, near the market; and, it is reported, that of twenty or more, first seized, not one recovered. The vicinity of the market-place and Fort-hill were the principal seats of this pestilence: the former sunken, and serving as a reservoir of all the filth wafted by rain or otherwise from the adjacent more elevated grounds; the latter greatly exposed to reflected heat, badly ventilated, and the sickly parts of it very thickly inhabited. In and near both these situations large quantities of putrid hides and of putrid beef were stored. Many pointed instances of malignant disease, derived from these sources, are mentioned in this important communica-

tion from our correspondent, which will be inserted at large in our next number. Upon the whole, no doubt seems to be entertained in that town of the domestic origin of the disease. The number of deaths in Boston has been stated at 250, but it is believed that 300 do not exceed the real amount. The disease prevailed with great malignity till about the middle of October, when it was checked by a storm from the north-east of three days continuance.

We are informed by Dr. Wheaton, that Providence, in the State of Rhode-Island, has been remarkably healthy during the late season. There have been only four or five cases that could be properly denominated cases of the late prevailing pestilence. In the northern extremity of the town, elevated and generally healthy, thirty or forty cases of a low continued fever appeared during the hot season, only two or three of which proved mortal. —Opinions have been divided as to the origin of this fever: for while the drawing off of a mill-pond, not more than a quarter of a mile westward of this neighbourhood, at the commencement of the hot and dry weather, seemed to afford a satisfactory explanation of the effect, much stress was laid upon the situation of a number of tan-yards in this quarter, stocked with a pretty large quantity of imported hides, more or less damaged, and deprived of the usual supply of water by the excessive drought.

The principal part of our information concerning the disease, as it appeared at New-London, is derived from a judicious publication of Mr. Charles Holt. It is remarked, in this pamphlet, that the infection, which first appeared about the 24th of August, was confined to a particular part of the city, chiefly within an hundred rods north and south from the market. In a defined space below the market, excluding the buildings which were evacuated, and the people who fled, are fifteen houses, shops and stores, in which lived, or were employed, ninety-two persons—of whom ninety had the fever, thirty-three died, and two escaped. The deaths above the market were not in so great a proportion. By October 28, the fever had nearly disappeared, after having, in about eight weeks, cut off eighty-one persons. The author considers the idea of importation as incapable of support either by fact or argument; and, therefore, hesitates not to ascribe it to domestic causes. He particularly states, that the disease was not spread or communicated by infected persons, clothes, or other substances. People who had been in the infected part sometimes carried the disease into the country, and there died of it; but without any other person receiving the infection from them.*

* Mr. Holt mentions one or two exceptions to this general obſervation; but as there is no ſpecific detail of circumſtances, it is preſumed ſome miſ-

With respect to the city of New-York, it appears, from accurate documents, that the number of deaths from August 1st to November 10th, amounted to 2086. The committee of the Medical Society appointed to inquire into the origin, causes and prevention of this epidemic, have brought in their report, which has been received, and ordered to be published by the society. This report rejects, in the most unqualified terms, the opinion of the importation of the disease from abroad, and asserts, that "these sto-"ries were founded in misrepresentation, and fostered by preju-"dice." The sources whence the disease originated in various parts of the town are distinctly pointed out, and the means of averting such calamities in future judiciously recommended.—Similar principles are also maintained in the reply of the joint Committees of the Corporation of the city, of the Health-Office, and of the Chamber of Commerce, to the general Committee of citizens in Philadelphia—for which see the Appendix.

In the State of New-Jersey, it is affirmed, on good authority, that many instances of yellow fever were observed. Several cases of the disease occurred to Dr. Elmer, of Bridgetown, and to Dr. Lummis, of Woodbury. These gentlemen concur in asserting that the disease originated from local and domestic causes.

In our account of this epidemic in Philadelphia, as inserted in the last number, the amount of deaths was inaccurately stated. The whole number of victims, exclusive of those who died in the country, were 3645. As much diversity of opinion exists in that city, concerning the origin of their pestilential diseases, we think proper to quote, as an authority deemed respectable by all sides of the question, the answer of the President and Managers of the Marine and City Hospitals to a number of inquiries concerning the disease, propounded by the Secretary of the Commonwealth of Pennsylvania, under the direction of the Governor. These gentlemen declare, that "the law, in respect to quaran-"tine, has been construed and executed in the strictest sense. "Every power and effort which the Board, or the officers under "their direction, were capable of exercising, has been employed to "cut off all communication with the vessels under quarantine. "Every possible mode of purification, which a law so manifestly "defective would permit, has been adopted, and the most rigid "scrutiny had, before the vessels were permitted to proceed to "the city. At the Marine Hospital the fences were extended "into the river, the more completely to enclose the premises, and "all intercourse therewith precluded.—Unshackled by prejudice, "and diffident of opinion, we have endeavoured to trace the dis-

take has been committed. And we are confirmed in this presumption by very valuable communications concerning the epidemic of New-London, from the Rev. Mr. Channing, and Dr. Coit, received since the above went to press, which will be inserted in our next number.

"ease to its origin, but without success. Those objects which "have been pointed to with the greatest confidence, as the foreign "source of the disease, on investigation afford no such proof."

From Savannah, in Georgia, we learn that the late season has been very unhealthy. Dr. Lemuel Kollock, physician in that town, informs us that they "have experienced a large share of "severe sickness in the last summer and fall. Bilious remittents "are the prevailing diseases of our climate; but this year, from "the severity of heat and drought, succeeding great and conti-"nued rains in the spring and beginning of summer, they have "been more severe and obstinate than ordinary."

Upon the whole, it appears to us that a great mass of concurrent evidence, derived from different places, and substantiated by various combinations of facts, decisively opposes the doctrine of imported contagion, and establishes the domestic generation of the late pestilence in the United States.

Philadelphia, Jan. 10.

At a meeting of the American Philosophical Society, held at their Hall, on Friday the 4th day of January, 1799, between the hours of 2 and 5 P. M. for the election of officers for the ensuing year, the following persons were duly chosen:

THOMAS JEFFERSON, *President.*

Casper Wistar, Benjamin Rush, Robert Patterson, *Vice-Presidents;* John Vaughan, *Treasurer;* Thomas C. James, James Woodhouse, Samuel H. Smith, Adam Seybert, *Secretaries;* Charles W. Peale, Benj. S. Barton, Nicholas Collin, *Curators;* Robert Blackwell, Thomas M'Kean, Adam Kuhn, James Davidson, *Counsellors.*

The following donations and communications were received by the American Philosophical Society during the last six months.

A copy of Geo. Adams's work on the microscope, with a volume of plates—also, Adams's Geographical Essays, corrected by William Jones, with plates: presented by William Jones, Esq. London.

A letter from Dr. Priestley, being an appendix to his former communications, on the decomposition of water.

A communication from Mr. Andrew Ellicot, determining the latitude and longitude of the town of Natchez.

Dr. Barton's "New Views of the Origin of the Tribes and Nations of America," second edition: presented by the author.

Three barrels, containing the bones of non-descript animals, and two meteorological journals kept at Detroit, and on a voyage to Michilimacanac on the Lakes, by General Wilkinson.

A specimen of Mica, from New-Hampshire, presented by Mr. Passmore.

Seven half volumes of the American edition of the Encyclopædia, which complete the work: presented by Mr. Thomas Dobson.

A "Memoir on the Sand Hills of Cape Henry, Virginia, by H. B. Latrobe."

"Experiments and Observations on the Atmosphere of Marshes, by Adam Seybert, M. D."

A paper "Concerning the pernicious effects of the Equizetum Hyemale, or Rough Horsetail, when eaten by Horses, by B. S. Barton."

An answer to Dr. Priestley on the doctrine of Phlogiston and the decomposition of Water, by James Woodhouse, M. D.

January 7th, 1799. ADAM SEYBERT, *Secretary.*

THE MEDICAL LECTURES, at DARTMOUTH COLLEGE, commence the first of October annually, and continue ten weeks, on the following branches, viz. ANATOMY, SURGERY, and MIDWIFERY; CHEMISTRY and MATERIA MEDICA; THEORY and PRACTICE of PHYSIC.

This institution was established in August, 1798; *at which time the degree of* BACHELOR IN MEDICINE *was conferred on* JOHN ADAM GALLUP, Bethel, Vermont; LEVI SABIN, Rockingham, Vermont; and the honorary degree of M. B. on LYMAN SPALDING, of Harvard.

Present Medical Officers.

NATHAN SMITH, A. M. *Professor of Medicine, Lecturer on Anatomy, Surgery, Midwifery, Theory and Practice of Physic.*

LYMAN SPALDING, *Lecturer on Chemistry and Materia Medica.*

Dysentery caused by Nitrous Acid.

Daniel D. Walters, Apothecary in New-York, relates of himself the following case of the effects of aqua fortis (septous acid) taken into the stomach. He had exercised himself considerably on a day near the end of April, 1798, and had become thirsty; entering his shop in this situation, he took a large bottle, which he supposed to contain water, applied it to his mouth and drank heartily; immediately after swallowing the last mouthful, he was sensible of a sourish disagreeable taste, and on inquiry, found that his boy, instead of putting the water for drinking into the accustomed bottle, had poured it into another bottle of the same material, size and capacity, standing beside it: neither of them being marked or lettered; and the bottle into which the water, by mistake, had been poured, was the one in which aqua fortis had been kept and not completely poured out. The liquid he swallowed was therefore a dilute aqua fortis (septous acid). Within a few minutes a deadly and intolerable nausea came on, which, within a quarter of an hour, ended in vomiting. After this he felt better till some time after, when pain, griping and flatus came on, and about fifteen hours after taking the dose, tenesmus and bloody

stools followed: these latter symptoms were attended with headache and fever, and the dysentery lasted two days, and gradually went off, no medicine having been taken.

The brother of Mr. Walters, who drank of the same acidulated water, was also excessively incommoded by it, and was put in extreme danger of dying.

Dr. Duncan, professor of the Institutes of Medicine in the University of Edinburgh, in a letter to Dr. Miller, proposes to send annually to the library of Columbia College in this city, a copy of the Inaugural Dissertations published at that University, with the expectation of receiving those of the College in exchange. It is scarcely necessary to observe that this proposal will meet a ready concurrence.

It was stated in our last number, that the *Elk* was a different animal from the *Moose;* of this we have further confirmation, by having had an opportunity of several times seeing a Moose, now exhibited in New-York. He is 17 months old, and was taken in the Province of *Maine*. The reader may rely on Pennant (2 Art. Zoology, p. 18.) for the description and history of the *Moose*.

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*On the Friendship of Birds.** By *Mr. S. Simpson, of New-York.*

Mr. Myers, a brother-in-law of mine, moving from Wilton to Philadelphia, desired me to send for a large turkey-cock and hen, and a pair of bantams, which had been a long time in his yard, and which the family did not choose to have killed. Accordingly, after his departure, I had them brought home, and put with some other poultry that were then running in my yard. Some time after, as I was feeding the poultry from the barn door, a large hawk turned the barn, and suddenly made a pitch at the bantam hen; she immediately gave the alarm, by a noise which they generally make on such occasions, when the large turkey-cock, who was about two yards distance, and who I presumed saw the hawk's intentions, and the imminent danger of his old acquaintance, flew at the hawk with such violence, and gave him such a severe stroke with his spurs as he was going to seize his prey, as to knock him from the hen to a considerable distance; and the timely aid of this faithful auxiliary, the turkey-cock, saved the bantam from being devoured by the hawk.

On the Sagacity of Birds. By the same.

During my residence at Wilton, early one morning I heard a noise from a couple of martins, who were jumping from tree to tree adjoining my dwelling. They made several attempts to get in a box or cage fixed against the house, which they had before

* See Medical Repository, vol. i. p. 367.

occupied; but they always appeared to fly from it with the greatest dread, and repeated those loud cries which first drew my attention. Curiosity led me to watch their motions. After some time a small wren came from the box or cage, and perched on a tree near it, when her shrill notes seemed to amaze her antagonists. After some time she flew away. The martins took this opportunity of returning to their cage: but their stay was short. Their diminutive adversary returned, and made them fly with the greatest precipitation. They continued manœuvering in this way the whole day, and I believe the wren kept possession during the night. The following morning, on the wren's quitting the cage, the martins immediately returned, took possession of their mansion, broke up their own nest, which consisted of twigs of different sizes—went to work, and with more industry and ingenuity than I supposed they possessed, they soon barricaded their doors. The wren returned, but could not re-enter. She made attempts to storm the works, but did not succeed.—I will not presume to say that the martins followed our modern maxim, and carried with them a sufficiency of food to sustain a seige, or that they made use of the abstinence which necessity sometimes, during a long and bad storm, might probably occasion; but they persevered, for near two days, to defend the entrance within the barricado: and the wren, finding she could not force an entry, raised the seige—quitted her intentions—and left the martins in quiet possession, without further molestation.

We are obliged to Dr. J. E. WHITE, *of Waynesborough, in Georgia, for an Account of the two following Cases:*

1. *A Case of Syphilis treated by the Nitric Acid.*

The patient (a negro man) had contracted the disease three weeks previous to his being put under my care, and nothing had been administered. Upon examination, I discovered the glans penis covered with a number of small distinct chancres; and, on the side of the penis, one of a considerable size. Buboes had also made their appearance: the one in the right groin was nearly as large as a bird's egg, and blotches had come out on different parts of the body, more particularly the face. I immediately directed the following drink:

℞ Acidi Nitrosi, fort. ʒ iss.
Aquæ Communis, ℔ iss.
M. Bibat quotidie.

The ulcers I washed with a solution of the hydrar muriat. in water, a grain to the ounce, and sprinkled over them a little calomel; but made no application to the inguinal swellings.

The above drink he took (sweetened) for five days, when, dis-

covering that it produced no effect on the stomach or bowels, I increased the quantity of the acid to ʒ ij. daily; which was continued for about two weeks, when I discharged him with very small remains of one of the swellings, for which I directed a little longer use of the acid.

After he had taken the nitric drink about a week, the chancres on the glans were entirely healed: the other closed soon after. The swellings gradually diminished in size, and the blotches very soon disappeared. Throughout the whole time of his taking the drink, I never discovered the least disagreeable effect to be produced on the first passages.

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2. *A Case of Epilepsy treated by Argentum Nitratum.*

The patient was a boy aged six years. He had laboured under the disease from the time he was eighteen months old. The fits recurred most frequently in the night, generally to the number of four or five; but he has been known to have sixteen in that space of time. He rarely passed a night without having more or less, except once, for about two months, when they entirely ceased; but they very seldom recurred during the day. Various remedies had unsuccessfully been tried, and the fits had now become worse than ever they had been known, returning very frequently both night and day.

I was applied to, and thought it a fair case for giving the nitrated silver: I accordingly directed it in the following manner;

℞ Argent. Nitrat.
Medull. Pan. aa. ʒ ss.
M. and divide into thirty pills;

One to be taken night and morning. After he had taken four of the pills the dose was increased to three in the day, (one being taken at noon) without producing any sensible effect. He had continued their use but four days, before the fits seemed to be suddenly arrested in their progress towards a fatal termination, and he remained entirely free from them for nearly two weeks. He had now a very slight return of them, and I ordered five pills to be given in the day. This dose was continued for a short time, when I increased the quantity of the argentum nitratum in each pill, to one grain and a half, of which he took four in the twenty-four hours, for a few days, (still remaining entirely clear of his complaint) when he was seized with the fever of this climate, which, from inattention, quickly put a period to his existence.

Though it cannot be determined what would have been the issue of this case, yet, in my opinion, the most unequivocal proofs were given of the good effects of the medicine; and I shall not fail, in future, to make trial of it in cases that I may deem proper for its exhibition.

FOREIGN.

[*The following paragraphs are taken from the Monthly Magazine for Sept.* 1798.]

THE second edition of Dr. Rollo's work on the '*Diabetes* '*Mellitus*,' with the results of the trials of various acids and other substances, in the treatment of the lues venerea, containing many additional facts and illustrations, is in the press, and will be ready for publication early in November next.

Mr. Blair, surgeon of the Lock Hospital, &c. is upon the eve of publishing *another* Collection of Cases and Observations on the Effects of the new Anti-Venereal Remedies, which have been proposed by various medical gentlemen in the treatment of Syphilis.

Dr. Frederick Hirsch, dentist to several German courts, has lately published the following account of an approved '*Remedy for the Tooth-ache:*'

'In the practice of my profession of a dentist,' he says, 'I have particularly turned my attention to the cure of the tooth-ache, and I learned from a celebrated German physician, as well as from the *Journal der Erfindungen, &c.* "Journal of inventions, theories, and contradictions, in natural philosophy and physic," No. xiv. p. 135, that among other insects the well known ladybird, *Coccinelle septempunctata*, possessed a peculiar virtue against the tooth-ache; I was induced to collect some of these insects. On repeated trials I found it to exceed my expectations, and I was so happy as to cure several persons speedily and completely with this small insect, finding myself obliged to repeat the remedy only in the cases of a few female patients. My method of proceeding was as follows: I crushed the insect between my thumb and fore-finger, and rubbed it between them till their points grew warm. With the fore-finger and thumb thus prepared, I then rubbed both the affected parts of the gum, and the aching tooth; upon which the pain, in every instance, except in the case mentioned above, completely ceased; I found, likewise, that the medicinal virtue of this insect was so powerful and durable, that my fore-finger was capable of removing the tooth-ache for some days after, without crushing an insect on it afresh. It is not to be expected, however, that this insect, when preserved dead, should produce the like effect; as then its internal parts, in which its virtue may be presumed chiefly to reside, are wholly dried up, leaving nothing but the wings and an empty shell. I could wish, therefore, that some skilful physician would impart to me, from his own experience, a method of preserving the virtue of this insect, so that its efficacy may be in full vigour throughout the year.'

Mr. Humbolt has made several experiments on the subject of the germination of seeds in the oxy-muriatic acid, and has found that this acid has a remarkable effect in accelerating the progress of vegetation. The seeds of garden cresses, when thrown into the fluid at the temperature of 88, shewed germs in three hours, while none were seen in water in 26 hours. Professor Pohl, at Dresden, produced, in this manner, vegetation from dried seeds in a collection of plants 120 years old, and Messrs. Jacquin and Vander Schott, at Vienna, have caused the growth of old seeds in the botanical garden, which had resisted every other method.

Mr. Vauquelin has made a new analysis of the red lead ore of Siberia, and asserts that it contains a new metallic acid, to which he gives the name of *Chrome*, on account of its property of colouring every substance combined with it.

The Royal Academy of Medicine at Barcelona has proposed the following question: Whether Cold Baths are useful or prejudicial in disorders in the breast, and what their effects, according to circumstances?

The Royal Society of Copenhagen has proposed the following prize questions:

"What will be the data for estimating the quantity of heat produced in different circumstances, and by different combustible materials used in œconomical purposes, such as wood, turf, fossil and pit-coal of every species? These must be calculated at least for four different cases: 1st. Where the fuel is burnt in a stove, in order to heat a given quantity of air, as in a chamber: 2d. When employed for boiling any liquid: 3dly. When used for hardening any soft substance, as in baking bricks: 4thly. When employed for melting any hard body, as in fusing metals in an assaying or melting furnace. These experiments must be so instituted, that from them may be computed both the proportional effects of each method of applying heat, and the œconomical advantages of each species of fuel."

Agriculture. Modern husbandry has introduced many important improvements in the rotation of crops, but perhaps few more advantageous than the late one of sowing turnips after flax, hemp, and crops of that kind, as is done in several different countries.

Many useful discoveries have unquestionably been gradually introduced in the feeding of domestic animals by different English farmers; but there are many roots that have been but little attended to in this point of view in this country: of this kind is the *parsnip*, which from its containing a large portion of the sac-

charine principle, must be highly nutritious: on trial, it has indeed been found, both in Guernsey and Jersey, where it is cultivated on a large scale, to be extremely profitable for fattening hogs and different kinds of poultry.

Another improvement of this sort is much less attended to by practical farmers than its importance seems to require. This is the bruising and proper reducing of corn before it is employed in the feeding of animals. If this be properly performed, the writer of this article is convinced, from a variety of trials, that a saving of at least one third of the grain may be effected. The principal objections to this mode of feeding are the trouble of performing the operation, and the expence of the utensils. The latter might, perhaps, be much obviated by an alteration of construction, and the former cannot be of much consequence in many situations. The subject, at least, in every point of view, deserves more consideration.

Though modern chemistry has certainly thrown great light on the operation of lime applied as a manure, the subject is not yet free from difficulties. The chief way in which it effects useful changes in lands is, however, most probably by promoting the putrefactive process, and thereby increasing the quantity of carbonaceous matter, and rendering new combinations favourable for vegetation more easy.

A German physician, of the name of Mark, discovered that acorns may be used with advantage as a substitute for coffee. Considering the dearness of this article, it will prove a discovery of much importance.

In the works of two late Italian writers on the agency of the gastric juice and saliva in rendering substances capable of absorption by means of friction, we observe the following notices:

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The effects of opium, mixed with gastric liquor, are declared to be salutary.—By the report of Dr. Chiarenti, Dr. Brera was induced to repeat and vary the experiments; and with this view, he caused patients, in whose cases opium seemed to be indicated, to rub in about ten grains of this drug, mixed with a drachm of gastric liquor, twice or thrice in a day; and he affirms that great advantage followed the practice. He next tried other medicines. Thus he prepared a mixture of squill and gastric liquor; and he caused persons, ill of the dropsy, who had been disagreeably affected by the internal use of squills, to rub it into the loins, the thighs, and other parts. The experiment succeeded: the medicine proved diuretic, and the patients recovered. *Terra foliata tartari*, foxglove, and other articles applied in the same way, operate not less beneficially.—The gastric liquor is not the only animal fluid

that is fit for the purpose. Professor Brera is convinced, by multiplied trials, that opium, squill, sublimate, and tartar emetic mixed with saliva, equally exert their specific powers.

Fluids of a different kind seem not applicable to the same end. At least, the author affirms that squill, with volatile salve, gum-water, and with unctuous oil, proved totally inefficacious.

Dr. Brera supports his observations with trials made by Dr. Ballerini at Pavia, and by Dr. Benvenuti at Turin; and he promises to furnish reports, at large, of the several cases.

APPENDIX.

DOMESTIC.

ARTICLE I.

Affinities and Relations of Septic (Nitric) or Pestilential Fluids to other Bodies. In a Letter from Dr. MITCHILL, *F. R. S. E. Professor of Chemistry, Agriculture and Medicine, in the College of New-York, to Sir* JOHN SINCLAIR, *Bart. M. P. President of the Board of Agriculture, &c. dated New-York, the 28th of November,* 1796. *Intended as an additional Article to the proposed Report of the British Board of Agriculture on the Subject of Manures.*

SEVERAL of the publications of the Board of Agriculture, of which you are President, having been some time since forwarded to the Agricultural Society of New-York, all the members of that institution felt pleasure in knowing that a friendly communication was opened. I have, in a particular manner, experienced high gratification in the perusal of several of your tracts, but by none that I now recollect so much as by the report and papers on manures. For more than a year I have been convinced, that the pestilential vapours which kill annually so many of the inhabitants of the United States, are good manures, or are exhalations from substances that are convertible to good manures. Some of the facts that have led me to adopt that opinion are already before the public. In the pages I now offer to you, I have stated some additional considerations. It has been often remarked, and there is much truth in the observation, "that the most fertile coun-"tries are the least healthy." If the suggestions contained in the present letter have any weight, I entertain no doubt, that the connection between *fertility* and *distempers* will attract a due share of notice from the intelligent and observing gentlemen concerned in completing your grand survey. The preservation of health among the labouring classes of mankind, though so little the object of police, is nevertheless eminently interesting to humanity, and ought to form a special article in the code of rural œconomy. If it can be shewn what the cause of their sickness is, and what are the attractions and connections of this with other substances, a great step

will be taken towards the prevention of this class of human sufferings. In the mean time, I may mention I have not leaned more towards the *medical* contemplation of the matters before me, than seemed necessary to shew the connection, which is a very intimate one, between farming and physic.

While I was engaged in investigating the manner in which pestilential fluids exerted their powers upon the human body, and just after I had arranged the materials of my letter to Mr. Havens, an occurrence, of a kind novel to myself, befel a man in the infirmary of New-York. Being then in attendance as a physician, I was requested to take under my charge one of the patients in the surgeon's ward, who had, several days before, been seized with an intermitting fever, and severely handled by it. On inquiring into the particulars of his indisposition, I found the complaint for which he had been admitted into the house, was an ulcerated leg. This, for some time, had been dressed with red precipitate (septite of quick-silver) in such large quantities, that the bottom and sides of the sore were frequently covered with it in its undecomposed state, when, at the customary time, the surgeon's assistant renewed the dressings. Such a long continued and plentiful application of the escharotic seemed to have afforded septic (nitric) acid enough to be absorbed into the vessels, and apparently to work considerable effects upon the constitution. To this interpretation of the disease I called the attention of the by-standers, and the circumstances of the ulcer, with the febrile symptoms, had so much of the probability of cause and effect, that we were generally of opinion the feverish commotion might have been stirred up by the acid absorbed after its disengagement from the mercury.

This remarkable event engaged me in reflecting what should be the reason, if septic fluids are so very abundant in the air as they are proved to be, especially in large cities, situated and regulated as many of those in the United States are, and at the same time, if they were so easily absorbed as experience shews they may be, that their bad effects should not be more frequently felt, and mortality greater than that which prevails at present, be the consequence?

It soon appeared to me, that the pot-ash thrown into the streets with the dissolved soap which had been employed in washing, was possessed of qualities, enabling it to attract and attach these vapours, and existed in quantity sufficient to take a vast volume of them out of circulation. My ideas were reduced to a sort of system on the subject, by the following estimate. The city of New-York contains 60,000 inhabitants. One pound of hard or bar-soap is required to wash the clothes of ten persons for one week. The consumption of soap, therefore, by the citizens, will be $60{,}000 \div 10 = 6{,}000$ pounds a week. Strangers, sailors, and other

transient persons may be supposed, on an average, to amount to 5000, which will make the weekly consumption 500 pounds more. The quantity used up for cleaning houses, furniture, &c. and by barbers, scourers, &c. may be estimated as an additional 500. The whole weekly consumption thus amounts to 6,000 + 500 + 500 = 7,000lbs. The yearly consumption will consequently be 7,000 × 52 = 364,000lbs. One third of the whole weight of soap is alkaline salt, consequently the quantity of pot-ash expended and thrown away in the city of New-York, is 7,000 ÷ 3 = 2,333⅓lbs. every week, or 121,333⅓lbs. upwards of 54 tons, per annum.

Such an amount of pot-ash is capable of counteracting the effect of an exceedingly great bulk of pestilential fluids, by attracting them to itself, destroying their aërial form, and thereby constituting salt-petre. If, as CHAPTAL computes (Elements of Chemistry, &c.) one hundred grains of pure nitre contain thirty parts of septic acid, joined to sixty-three of pot-ash, and seven of the water of chrystallization, then, upon the supposition that the whole of the alkali thrown into the streets is converted to nitre, there must be an addition of septic acid, equal to $\frac{30}{100}$th parts of the whole, to neutralize the salt; that is to say, 121,333⅓ × 30 ÷ 100 = 36,400lbs. or more than 16 tons of septic acid, requisite to turn such a mass of alkali to salt petre; and in the same proportion for any smaller quantity.

In the foregoing estimate, the whole quantity of soap is reduced to hard soap for the following reason. Soft soap is sold at a much lower rate than hard, because it is much weaker. It is therefore used in families more extravagantly, and it is presumable, that the same quantity of alkali is expended as there would be if hard soap, and none else, was used.

But the solutions of soap poured into the gutters are not the only sources whence the pot-ash is derived; for the wood ashes of hearths exposed, as it is, in yards, cellars, and ash-holes, or cast into the streets, furnishes a large additional portion of alkali. The fact I am about to mention shews, at once, the reality of such a process, and the existence of septic acid in our houses. On the lower floor of a rear building, in the city of New-York, the back part of a closet was a thin brick wall. On the outside of this wall, in the yard, the ash-house was built. The only separation between the ashes put there and the closet, was the narrow partition of bricks. Their substance was so porous, that, in the course of time, a saline efflorescence was observed on the bricks within the closet near the floor. On examination, the pot-ash, which had apparently penetrated through the wall, in a state of solution, was found to be changed to nitre, by a combination with septic acid, which it had doubtless attracted from the air of the room.

In these ways does it seem, that a considerable proportion of the

mischief is prevented which would be caused by such noxious steams, if left to float about at large. If the scrapings of this city were employed in the manufacture of salt-petre, they would unquestionably afford a large quantity of it. But as they are generally sold to the farmers for manure, it is worth the while to examine, what are the effects of the septite of pot-ash upon growing plants as a manure. Here, there might be safely an appeal made to the ancient and common opinion of mankind in favour of nitre as a fertilizer. But, as TROMSDORF (GREN. Journal der Physick, &c. 14. Monthly Review enlarged, Appendix, Art. x.) has made a comparative experiment on the growth of vegetables in distilled water, and in an aqueous solution of salt-petre, there will be no need of referring the matter to popular belief. He took two pepper-mint plants of equal weight, and put one into a vessel of distilled water, and the other into distilled water, wherein salt-petre was dissolved in the proportion of fifteen grains to half a pint. The plant placed in the solution of nitre grew more quickly and vigorously than the other; and, at the end of four months, on being weighed, had acquired 378 grains more than its fellow, which, as well as itself, had a healthy look, and emitted a strong scent. And what is very remarkable in this experiment is, that from the detonation of the dried powder of the sprig which had grown in the solution of nitre, that salt itself had not, in this instance, undergone decomposition by the vegetative power, but had been wholly absorbed by the plant.

This experiment of the operation of the septite of pot-ash deserves consideration in connection with those made by SENNEBIER (Experiences sur la lumiere solaire, &c. Mem. 2. § 1.) on the combination of *mineral* acids, as they are very unphilosophically called, with lime. He found that all the *mineral* acids (the *septic* being one) mixed with water, would cause an emission of pure air from the leaves of plants, exposed to the sun-shine; but that, in order to effect this, it was necessary to add mild calcareous earth (carbonate of lime) to the water with which these acids were mixed. The sulphuric acid turned this to gypsum (sulphate of lime); the septic changed it to calcareous nitre (septite of lime.) The fertilizing effect of the former is well known, and the character of the latter, as a good manure, is sufficiently established. But while these combinations with lime were forming, a quantity of carbonic acid (fixed air) was extricated from it, and mixed with the water. Experiments shew, that this acid, so blended with water, is absorbed by plants; the basis of the acid (carbone) being retained, and the oxygene discharged through the leaves. When vegetables are thus manured with gypsum, calcareous nitre, and fixed air, and are furnished at the same time with a sufficiency of light,

heat and water, it is not wonderful that they should live and perform their functions well.

If VAN MONS (CRELL Chemische Annalen, &c. 14 M. R. ubi supra, Art. 7.) is accurate in his experiments on the decomposition of the fixed alkalies, and his declaration true, that they contain septon (azote), then can it be conceived, that plants may acquire it from pot-ash, when this is used in its proper form as a manure, and the manner of its operation be comprehended. This view of the subject is the more important, as that experimenter affirms the fixed alkalies, like the volatile, are decomposed by substances that readily part with their oxygene, and during this process the *septous* (nitrous) *acid* is formed.

Though such a decomposition may happen, yet a more common effect of the vegetable fixed alkali (pot-ash) upon land, as a manure, is by absorbing the septic acid. Accordingly it is found to be useful upon a deep soil, containing a very considerable quantity of animal and vegetable substances; and upon those lands which the farmers call "dead" with over-manuring. (SOMMERVILLE on Manures, &c. Art. 33. p. 74.) Such an operation it possesses, too, in dung-heaps, forming, with their acid, a true saltpetre, as Mr. HEADRICK (Essay on Manures, p. 9.) testifies. But what is remarkable, is HOME's *direct* experiment that septous acid (spirit of nitre) mixed with water, promoted the growth of plants in a very perceptible degree. (Principles of Agriculture and Veget. p. 117.) *Hard* waters (Idem. Essay on bleaching) are found to owe their hardness to the *acid of nitre* joined to an absorbent earthy base (calcareous nitre); and this sort of water is found to afford a strong nourishment for plants. (Principles, &c. p. 113.)

The influence that the septic portion of the alkali of wood-ashes, both before and after its employment by the soap-makers, exerts as a manure, as well as the effect produced by septic acid and the septite of pot-ash, in furnishing septon to such vegetables as require it, will enable us to understand a fact, mentioned by SWINBURNE. (Travels into the two Sicilies, &c. p. 92.) When LAUTREC, at the head of the French army, invested Naples in 1528, his troops were cut off by a pestilential disease, which was greatly aggravated by the vapours exhaling from CORN, thrown into the ditches, and there corrupting in the water. This grain, which contains the principle of putridity, derived from the soil where it grew, in all probability combined, as it rotted, with enough of the oxygene of the water to form much septic oxyd and acid; and these diffusing themselves into the neighbourhood in the form of gas or vapour, were sufficient to render the place sickly, and even to destroy life.

The putrefaction of grain is particularly worthy of considera-

tion, as it respects wheat on ship-board. This sort of *corn* is remarkable for damaging the vessels in which it is exported from the United States. It rots their timbers, and causes them so rapidly to decay, that wheat in bulk is considered a very destructive freight. The reason seems to be, that a quantity of the grain falling through the flooring, slips between the timbers, and mingles with the moisture and bilge-water in the ship's bottom. Rotting there, it emits steams similar to those which arose from the ditches around Naples. These having no animals to exert their effects upon in the lower parts of the ship, attack the timbers, and spoil their solidity. Here now is an analogy which leads to the inquiry, whether the same pestilential matter which destroys men does not destroy timber too?

And this rotting of the timber of which sea-vessels are built, is connected with another fact well worthy of note, which is, that where the wood decays fastest, the corroding cause converts to rust, with proportional quickness, spikes and bolts of iron, driven there; the rusting of the metal depending upon the same cause as the rotting of the wood. And the ship-carpenters of New-York remark, that in repairing old vessels, even in doing inside-work, where the wood would seem to be penetrated chiefly by septic vapours, and not impregnated with sea-salt, the brightness of their axes and adzes is soon tarnished, and the steel is turned black.

This effect of the bad air of ships upon metals brings to my mind another memorable fact, from the Island of Jamaica. At Morant-bay some iron-guns had been thrown overboard from a vessel, and had laid partly buried in the mud or sand, between high and low water marks, for so long a time that they were considered as spoiled by the action of the salt-water. They were purchased as old-iron, to be melted down and cast into some kind of metallic ware at an air-furnace. On being dug up and examined, they were found, notwithstanding their exposure to the constant operation of the tides, to be less damaged, and in better order than the cannons exposed to the common air of that climate, in the fort. A similar fact is mentioned in 3 LOWTHROP'S *Abridgment*, &c. p. 547. where, "at Point Cagua, the iron-guns of the fort were so corroded, that some were nearly become useless, being perforated almost like honey-combs; but the guns which lay in the salt-water were not much endamaged by rust, as we found by taking up some."—In this air, linen and silk are exceedingly apt to rot; and if a lancet be once exposed to the air, it will *rust* though it be presently put up again; though not disposed to rust if never exposed to the air. The relator affirms that in Jamaica metals *rust least in rainy weather*. The cause of these changes wrought upon metals must therefore be something different from sea-water or rain-water. It is doubtless the septic acid

vapours, which, at the same time, so miserably affect human constitutions, that wounds are with great difficulty healed, and fevers often terminate in death, under its destructive influence. (Hunter, Diseases of Jamaica, &c.) This is the *septic poison* (venin septique), to use the correct words of ARTHAUD, (Description de l'Hospital Genêral du Cap, p. 12.) which rises after the fall of the autumnal rains in the Island of St. Domingo, sometimes almost suddenly destroying the vital principle; at others forming foul and gangrenous ulcers, and by its unconquerable malignity, causing wounds to resist all manner of remedies; and then again discolouring the skin, obstructing the mesenteric glands, keeping up a slow fever, inducing emaciation, and, finally, exhausting the strength by a serous flux. This aëriform venom brings on their plagues or malignant fevers, which, though of local origin, are generally said to have been imported in ships from the coast of Africa. (Histoire des Isles Antilles, &c. p. 2.) The natural diet and way of living among the American Carribbees often lengthened out their lives to one hundred and fifty years and more. (Ibid. p. 502.) On examining a considerable vocabulary of the Carribbee tongue, I have found no word to signify putrid or yellow fever. (Vocabulaire Caraibe, &c.) The Europeans, as they colonized these Islands, settled in unhealthy places, shunned by the wiser natives, or collected the materials of pestilential air, and manufactured from them deadly distempers on the spot. What a difference between their duration of life and that of the ancient Aborigines! The corrosion of iron, and *not by moisture*, is remarked by HILLIER (3 Ph. Trans. Abr. p. 625.) at Cape-Corse, on the coast of Guinea, during the *dry* weather, in a sickly climate. And what other exhalations can we suppose than these render Whidah so excessively unhealthy, that he who opens the ground, though it be but to dig a grave, runs the hazard of his life, from the pestilential steams which proceed from it? (Ibid.) Will not this connection between dryness and the decay of hard bodies explain the *dry-rot* of timber, (BATSON's Letter, &c. 2. Repertory of Arts and Manufactures, Art. xvii.) which ashes will stop?

Some precious remarks on the fixation of the *septous* (nitrous) vapours of manures by *earthy* substances are to be found in SCANDELLA's Letter to ARDUINO. (Outlines of the 15th chapter of the General Report, &c. addend. p. 12.) The author's observations, which were made for the Venetian territories, apply with great force to New-York, whose southern part is in nearly the same parallel of latitude with the north of Italy. SCANDELLA considers putrid diseases in the southern parts of Europe, if not originating from the septic exhalations of dung-hills and heaps of manure as their only cause, as certainly rendered more

dangerous by them. He observes, "they may be looked upon "as not far dissimilar from marsh-miasmata"—"and may afford "a fomes to periodical fevers." And in manufacturing manure in hot climates, he gives particular cautions against the putrid exhalations which it emits. The people of Great-Britain may imagine themselves secure from the noxious effect of these pestilential steams; but I have a confidence, if the matter was properly inquired into, they would find not only their jail, and ship, and hospital fevers originating from this effluvium, but that among their poor peasantry and manufacturers, though it is not concentrated enough to cause the high-wrought forms of febrile ailments in America, yet their typhus, in all its gradations, is fairly to be ascribed to the more feeble and gradual operation of these septic (nitric) vapours.

Are we not now enabled to understand the marvellous event related by GALEN, of the house in MYSIA set on fire by *pigeon's dung?* (3 De Temper. cap. 4. &c.) "Some pigeon-dung, "already putrid, and emitting vapours, and very hot to the touch, "had been thrown out in such manner that it lay in contact with "a wooden window that had been daubed with resin. About "mid-summer, as it received the direct rays of the sun, both the "resin and the wood took fire. The flames spread to some doors "and windows that were near, and also besmeared with resin, "and continued increasing until they invaded the house, and "consumed it." If the explanation I am about to offer be satisfactory, then will it appear what the precise nature of this effluvium from the dung was, and that the production of septous (nitrous) acid from the excrements of living creatures, and the corruption of dead ones, is almost as ancient as animal existence, and as extensive. But the property of this smoking and inflaming spirit *(spiritus nitri fumans et inflammans)* to set oily and resinous substances on fire by mixture, seems not to have been known until the experiment was made by O. BORRICHIUS. (Acta Hafn. Ann. 1671. Obs. 71.) It was repeated, and fully established, by FREDERICK HOFFMAN; and the fame of it drew LEIBNITZ and TSCHIRNHAUSEN from Berlin and Leipsic to witness it. (HOFFMAN. Obs. Phys. Chym. Lib. 2. Obs. 3.) There is great difficulty in precisely drawing the line between the oils, balsams, gums and resins. HOFFMAN, however, has shewn, that the *principle of acidity* (principio acido) added to *oil*, would *convert it to resin.* (Ibid. Lib 1. Obs. 15.) And this is exactly the modern opinion, that resins appear to be nothing else than oils rendered concrete by their combination with oxygene. The exposure of oils to the open air, and the decomposition of acids when applied to them, are considered as sufficient proofs of this conclusion.

Now, in order to interpret GALEN's fact, we have but to suppose the resin under-saturated with oxygene, and, consequently, capable of decompounding the septous acid. The evolution of heat, the bursting out of flame, and the combustion both of the resin and timber, follow, of course, as in the experiments related.

On a survey of this subject, I behold facts from all quarters pressing upon me. In this letter I have endeavoured to connect a few of them together in somewhat of a new order. But where will this immense inquiry end? Who shall define the extent of it? The septic compounds of which I am writing are but modifications of the "ACIDUM UNIVERSALE ET PRIMORDIALE," and the SAL UNIVERSALE ACIDUM PRIMOGENIUM QUOD IN IPSO AERE HOSPITATUR, ET QUOD, UT VETERES DIXERUNT, VENTUS IN VENTRE SUO PORTAT, of HOFFMAN, (Ibid. Lib. 2. Obs. 1.) and which, without knowing specifically what it was, SIMON PAULLI seems to have almost hit upon in his Παρέκβασις, p. 138. or Treatise on the Proximate Cause of Fevers. In this very learned and valuable performance, written more than a century ago, the author has shewn the dependence of malignant and petechial fevers, of measles, scurvy, syphilis, and a variety of other diseases, upon the same general cause, which he affirms to be a salt; "*Sal, sal dico, in sero massâque sanguineâ corruptum, ac volatile factum, iterumque fixum redditum, tam febrium* MALIGNARUM, *et in specie petechialium, quam* MACULARUM *in* MORBILLIS, *in* LUE VENEREA, SCORBUTO, *in* ELEPHANTIASE, *in* GANGRÆNA, *immo in* PESTE IPSA, *apparentium, et per consequens,* QUOQUE CONTAGII, *unicam et proximam causam.*"

This kind of compound seems also to have been almost expressed by DARWIN, (1 Zoonomia, Sect. XXVIII. 2.) where the *hectic fever* supervening, by admitting air to an ulcerated surface, on opening an abscess, is ascribed by that elegant and original philosopher, to the *azotic*, rather than to the oxygenous portion of the atmosphere; though he appears since to have charged it to the oxygene; in which he has, probably, not bettered his judgment: the preferable opinion being, that they are *both* instrumental in stirring up febrile commotion in the system, by forming a septic fluid, producing, with an allowance for peculiarity of attendant circumstances, an effect analogous to the patient whose case I related in the beginning of this letter.

It surprizes me, in looking into SCHMEISSER's edition of VON USLAR's Observations on Plants, that so little is said concerning the operation of the *septic* principle (azote) on the vegetable economy; but septon, (azote) so long overlooked, will probably attract more attention for the future.

In expectation of great good to arise from the work in which

you have engaged with so much public spirit and benevolence, and in hope that examples of talents and enterprize like those possessed by Mr. VOGHT, the COUNT of RUMFORD, and Sir JOHN SINCLAIR, may become more frequent, I conclude, by subscribing myself, with much admiration, yours,

SAMUEL L. MITCHILL.

ARTICLE II.

TO THOMAS MIFFLIN, *Esq. Governor of the Commonwealth of Pennsylvania, from the Academy of Medicine of Philadelphia, on the origin and means of preventing the return of the* YELLOW FEVER.

SIR,

IN order to comply with your request to the Academy of Medicine, communicated by Dr. Samuel Duffield, consulting physician of the port, respecting the means of preventing the return of the epidemic fever which has lately afflicted our city, the Academy have conceived the history of its origin necessarily connected with their answer.

We believe it was derived from the following sources:

1. The exhalations of the alleys, gutters, docks, and common sewers of the city; and from stagnating water in its neighbourhood.

2. The foul air discharged with the ballast of the ship Deborah, and the cargo of the brig Mary; the former of which arrived from Hispaniola on the 18th July, and the latter on the 29th of the same month. We reject the opinion of an imported human contagion in either of the above vessels. It has not been asserted that any person died of the yellow fever on board the Mary during her voyage; and if it be said, that several persons died on board the Deborah of that disease, on her passage to this city, we cannot admit that they contaminated the timbers or contents of the ship in such a manner as to spread the disease to persons at several hundred feet distance from the wharf at which she was moored. The improbability of this opinion will appear from two considerations:

First—The disease is not contagious in the West-Indies; and rarely, if ever so, in the United States in hot weather, at which time *only* it makes its first appearance in our country. So general is this opinion, that some physicians have unfortunately refused to

admit the existence of the fever in its commencement in our city, *only* because it was not contagious.

Second—The disease was, in no instance, propagated by those persons who were supposed to have derived it from human contagion, adhering to the timbers or contents of the Deborah and Mary, and who died with it in parts of the city remote from the influence of the foul air of those vessels.

If it be said that the contagion of the yellow fever is not uniform in its effects, it ought at least to be admitted, that it acts with most certainty where it exists with most force; but the reverse of this took place in the supposed origin of our late fever from imported contagion. We are the more determined in our opinion of the foul air of the Deborah and Mary being the cause of many cases of our fever, from similar cases of fever having been often produced from similar causes, instances of which were mentioned in our letter to you of last year.

In support of our opinion of the disease being derived from the exhalations of our city before enumerated, we shall mention the names of the following persons, who had the fever before the arrival of the Deborah and Mary in our port, viz. Benjamin Jones, Fromberger's Court, June 2d; Mary Wrigglesworth, near the corner of Walnut and Tenth streets, June 6th; Rebecca Trested, in Front, between Spruce and Union streets, June 11th; Eliza Curran, Fourth below South-street, 27th June; Mark Miller, Callowhill-street, and Molly Zeller, Race-street, July 3d; Miss Byrne, Spruce between Second and Third streets, July 11th; Mr. Vannost, Shannon-street wharves, July 12th. We observed, moreover, and heard of a considerable number of persons who had the disease in the western parts of the city, and in Southwark and the Northern Liberties, who had not been exposed to contagion, nor breathed the air in the neighbourhood of Water-street for many weeks, and in some instances for several months, before they were attacked by that fever.

In addition to the arguments in favour of the domestic sources of the fever, that have been mentioned in our former letter, we shall add four more, that we think cannot be refuted.

1. The atmosphere of our city, during the prevalence of the fever, produced sensations of pain or sickness in many people who came into it from the country; the same atmosphere became the cause of the disease and death in others who visited the city, and who carefully avoided lodging, or any intercourse with persons infected by the fever.

2. The disease prevailed in many inland towns of the United States which had no intercourse with those sea-port towns in which it was epidemic. Those towns were, in every instance we have heard of, situated near to putrid substances, or stagnating water.

3. The disease was rarely contagious, even when it terminated in death, when carried into the country, or into towns not exposed to putrid exhalations.

4. The general extinction of the disease by frost, clearly proves that it exists chiefly in the atmosphere; and that it is not derived, in the first instance, from human contagion; for frost, it is well known, does not act in the autumnal months upon the bodies of the sick, nor upon their beds, cloathing, or any other supposed receptacle of contagion.

We wish to direct the attention of our fellow citizens to the history of the causes and remedies of pestilential diseases in foreign countries. In the ages of medical superstition, when those diseases were believed to be imported, they nearly depopulated cities for many successive years. Frequent and accumulated suffering at last begat wisdom. The causes of pestilence were discovered to exist in all countries, and domestic remedies were applied to remove them. The effect of this change in the opinion and conduct of the nations of Europe, has been the almost general extirpation of malignant fevers from their cities and sea-ports. We have many documents to prove that the recurrence of the yellow fever has been prevented in the cities of Europe by cleanliness. It formerly prevailed in Italy, Spain, France, Germany, Holland, and, occasionally, in Britain and Ireland, under the names of putrid, malignant, and bilious fevers, also of the *gall sickness* and of the *black fever*. The last name was derived from the black vomiting which is so often the symptom of approaching death in bilious fevers.

We are the more confirmed in the opinion we have delivered, that the yellow fever is a native disease of our country, by discovering that the same opinion is held by most of the physicians and citizens of our sister states. We lament the prevalence of an opinion, that the admission of truth upon this subject will injure the credit of our city. Truth, upon all subjects, is ultimately friendly to general interest and happiness, while the remedies of the evils of error are always of a partial and transitory nature. We conceive that the report of the existence of a disease of a nature so subtle as to elude the utmost force of the health laws, and the greatest vigilance of health officers, will be much more injurious to our city, than a belief of its being derived from causes which are obvious to our senses, and which, by active exertions, might be *easily* and *certainly* removed, without oppressing or injuring our commerce.

We shall repeat, in this place, the means recommended by us in our former letter, with the addition of some others, for preventing a return of the disease.

1. "Removing all those matters from our streets, gutters, cel-

lars, gardens, yards, stores, vaults, ponds, &c. which, by putrefaction in warm weather, afford the most frequent cause of the disease in this country. For this purpose we recommend the appointment of a certain number of physicians, whose business it shall be, to inspect all such places in the City, the Northern Liberties, and Southwark, as contain any matters capable, by putrefaction, of producing the disease, and to have them removed.

2. "We earnestly recommend the frequent washing of all impure parts of the city in warm and dry weather, by means of the pumps, until the water of the river Schuylkill can be made to wash all the streets of the city; a measure which we conceive promises to our citizens the most durable exemption from bilious fevers of all kinds, of domestic origin.

3. "To guard against the frequent source of yellow fever from the noxious air in the holds of vessels, we recommend the unlading such vessels as contain cargoes liable to putrefaction, and the discharging the ballast of all vessels, at a distance from the city, during the months of June, July, August, September and October—To prevent the generation of noxious air in the holds of vessels, we conceive every vessel should be obliged by law to carry and use a ventilator; and we recommend, in a particular manner, the one lately invented by Mr. Benjamin Wynkoop. We believe this invention to be one of the most important and useful that has been made in modern times, and that it is calculated to prevent not only the decay of ships and cargoes, but a very frequent source of pestilential diseases of all kinds in commercial cities."

4. The filling up, or cleansing the docks in such a manner, that no matters capable of putrefaction shall be exposed to the rays of the sun at low water.

5. The closing the common sewers, so as to admit water only; and the daily removal of the filth of the city, destined to flow into them, by means of covered carts or waggons made for that purpose.

6. The prevention of the filth of the city from being accumulated, and stagnating in its neighbourhood.

7. The prohibitions of alleys and narrow streets in the future improvement of the city.

8. An alteration of the present health law, which, by detaining vessels with perishable cargoes for ten days at the hospital, in hot weather, is calculated to increase the foul air in their holds; and we recommend also, that no vessel, owned by a citizen of Philadelphia, be permitted to leave or enter our ports, that is not provided with a ventilator.

We shall conclude our letter by deprecating, in the most solemn manner, the continuance of a belief in the supposed importation

of our fever, an opinion which has led to the total negligence of the means of preventing its return; also by humbly hoping that a merciful Providence may not correct our ignorance and prejudices, by frequent returns of a calamity, which has, in five years, swept away ten thousand of our inhabitants, and which, in a few years, may, if not obviated by the only proper remedies, (under the influence of the present inflammatory constitution of the atmosphere) annihilate our city.

Signed by order of
The Academy of Medicine of Philadelphia,
PHILIP SYNG PHYSIC, *President.*

JOHN C. OTTO, *Secretary.*
December 3, 1798.

ARTICLE III.

Correspondence between the Citizens of New-York and Philadelphia, respecting Arrangements to guard against PESTILENTIAL DISEASES.

No. I.

Letter from Philadelphia to the Mayor of New-York, the Chamber of Commerce, and generally to the Citizens.

GENTLEMEN, *Philadelphia, Dec.* 3, 1798.

THE late distress, occasioned by the spreading of an infectious malignant fever, in this and other towns in the United States, has excited the fears and fixed the attention of all classes of citizens who regard either life or health.

It is to avoid entering upon a field of controversy, more irritating than profitable, that we content ourselves with saying, that this most afflicting malady was either imported among us from abroad, and found, in our air, qualities very favourable to its progress; or has originated among ourselves, from the impure state of air or water, or both.

Hence the necessity of endeavouring, as far as Providence hath put it in our power, to guard against foreign importation and domestic origin. The measures to be pursued to prevent its rise among ourselves must be the subject of separate consideration and precaution, adapted to our respective situations.

Laws calculated to prevent its introduction from abroad are of general concern, and require a similarity of proceedings. The same preventatives which, if adopted in a detached manner, may be wholly insufficient, if done in concert may have the happiest effects.

Experience has taught us the extreme difficulty of providing quarantine laws of a nature so energetic as to answer the desired purpose, especially when introduced only by one State, while its adjoining State may be inattentive to the subject.

Considerations offer, at the same time, which indicate, if not the impracticability, at least the extreme difficulty, of introducing efficient quarantine regulations: the extended coast of the United States: the manners of the people—unaccustomed to severe prohibitions—and the nature of our government. It is the opinion of some among us, that a total prohibition, in the months of ——— of all commerce from the ports of the Mediterranean and the West-India islands, during the present war, will be the only measure on which we can rely for effectual security against the introduction of this most dreadful scourge.

We are fully aware of the delicacy and danger of interrupting the course of commerce: we think it ought not to be done but in case of absolute necessity: we sympathise most sincerely with our mercantile brethren, on the peculiar hardship such a measure would bring upon them: we wish it not to be adopted but upon the most mature deliberation, nor if a quarantine law will answer the purposes we all have in view. Our older citizens inform us, that this disease has never appeared in what is now comprized within the limits of the United States, but while war has raged in the West-Indies. With that cause we flatter ourselves the effect will cease—an alternative of two evils presents—wisdom directs to choose that which, under all circumstances, shall be judged the least.

Congress alone are competent to the adoption of a measure of such high import and general effect. A partial provision of the kind would only induce ruin to some particular ports, without answering the great object in contemplation. A communication of sentiments, freely and fully, becomes expedient: and it is with this view that we have been nominated a committee, by our fellow-citizens, to address ourselves to you, and ask your candid opinion upon these particulars as early as may be convenient—whether the interdiction of the commerce, or an efficient general quarantine, be most expedient: as we shall prefer our application to the general government, if the measures of interdicting the West-India commerce, during the months of July, August and September, or longer, or a general quarantine law, shall meet general approbation. On the other hand, should the measure proposed be thought improper by our neighbours and brethren of the other States, we shall endeavour to obtain such appropriate regulations for ourselves as the limited powers of a State government may enable our legislature to afford.

Subscribed by their General Committee of Citizens.

No. II.

ANSWER OF THE CITIZENS OF NEW-YORK.

To ROBERT WALN, *Esq.*

SIR, *New-York, January* 14, 1799.

WE acknowledge, with pleasure, the receipt of the letter of 3d December, 1798, subscribed by yourself and several other citizens of Philadelphia, concerning the pestilential distempers which almost annually visit some part of the territory of the United States; and we wish you to understand, that we have not answered it sooner because we deemed it necessary to take time, and consider well the important objects proposed for our contemplation.

Having no disposition to indulge controversy upon speculative points, we believe ourselves safe in affirming, that, in addition to the numerous domestic sources of poisonous exhalations existing in our cities—the foul air and the exciting cause of sickness among people so frequently brought into our ports in vessels from places beyond the sea, are not taken on board, in bulk, in foreign ports, but engendered or manufactured below and between decks, during the voyage.

It is certainly of high importance, therefore, to employ all the means with which successful discovery and experience has furnished us, to guard our cities and our ships against the destructive operation of pestilence produced locally, from accumulated impurity in both.

There can be no doubt of the extreme difficulty of providing efficient quarantine laws, while they are grounded upon the prevalent mistaken notions of the subject. It is a general rule, when legislatures construct laws upon wrong principles, that they never produce the desired effect. What good is done to a foul vessel, cargo and crew, by causing them to lay at anchor for forty, or any other number of days, during the hottest part of the year, we never could discover. On the other hand, we are well satisfied that the retention of a sickly crew, a perishing cargo, and of the unwholesome air issuing therefrom on board, are sufficient, of themselves, to produce a great part of the mischief complained of, here under our own regulations and in our own harbours. Every vessel so circumstanced is becoming hourly more foul and pestilential; and, we are persuaded, in the greater part of the cases that occur, the blame is improperly thrown upon the ports of the Mediterranean sea and the West-India islands.

Judging as we do, we have no hesitation in assuring you, though we would consent to subject our commerce to the severest regulations that the public good may require, that the necessity for interdicting it, at any season of the year, does not appear to us to

exist. The sad experience of the city of New-York proves the opinion of your older citizens to be incorrect.

After much calm consideration of the subject, we are inclined to think, as a vessel is a floating house, inhabited by human beings, and often filled with perishable things, that this habitation and store-house grows foul, and becomes unhealthy, in the same manner that a house or habitation on the land does. Animal excretions and exhalations from corrupting substances, furnish their baneful effluvia on ship-board as well as on shore; and, in the former case, by their confinement, sometimes acquire extraordinary concentration and virulence.

If this idea is just, and we really can discern no material difference in the cases, ships ought to be purified in the same manner and by the same means that are found successful in removing infection from houses. They should be unloaded without an hour's delay; the corrupted parts of the cargo thrown into the water, or destroyed by fire, and the remainder exposed to the open air and sun-shine; immediately after which, instead of relying upon a little ventilation and fumigation, both of which are feeble and inefficient means, the whole wooden work of the vessel should be washed thoroughly with strong alkaline ley, made by dissolving pot-ash, pearl-ash, kelp or barilla, in water, and not be pronounced clean, until searched and penetrated by these sweetening and neutralizing salts, which, when duly applied, never fail to prevent infection if threatened, and to destroy it if it exists—If these cannot be had, lime is a good substitute.

All cloathing, bedding, and every other thing impregnated with animal effluvia, should be made to undergo the operation of these sovereign destroyers of all foulness, or of soap, which is but a modification of some of them—with the latter, the bodies of the sick and infirm should be repeatedly cleaned.

In short, we are candid and explicit when we inform you it appears to us that, by the neglect of these necessary operations, the matter of pestilence is produced on board our ships, and by a steady, plentiful, and repeated use of them, will that mischievous agent be quelled: therefore we should be glad to co-operate with you in bringing about a general purification according to this mode, which we believe will be highly beneficial, not only in the merchant service, but in the navy.

Neat houses are cleansed many times in twelve months—ships, for obvious reasons, should be purified much more frequently. It would be a good regulation, to render a ship unfit for service unless purified as above-mentioned, at least twice a year.

Ships have generally been pronounced clean after having been fumigated. The belief of the purifying effects of smoke has been extremely deceitful and pernicious. Will fumigation with tar

or brimstone cleanse a dirty shirt or a dirty house? No. How then can it purify a foul and infected ship?

Foul, sickly and infected vessels ought to be stopped and unloaded at some distance below our cities; and a regard to the collection of the revenue will necessarily make the providing a wharf, stores, a piece of land, and inclosures for the whole, in each sea-port, a matter of federal legislation. On this point we are heartily desirous of co-operating with you in getting such regulations by law, from the National Government, as shall at once prevent the introduction of foul merchandize, and secure the property of individuals, without embarrassing the proceedings of the Custom-house. To effectuate these objects we have forwarded a memorial to Congress, and request your co-operation.—And, in certain cases, where a ship is very foul, and unfit to be admitted to the city above, but has on board bales, packages, or any thing of an uninfected or unsuspicious nature, the transportation of these from the place of purification, or the vessel detained below, to the wharves of the city, may be quickened by means of lighters and small vessels.

Committee of the Corporation of the City.
JOHN B. COLES.
GABRIEL FURMAN.
WILLIAM BAYARD.

Committee of the Medical Society.
SAMUEL L. MITCHILL.
JOHN R. B. RODGERS.
JAMES TILLARY.

Committee of the Chamber of Commerce.
CORNELIUS RAY.
MOSES ROGERS.
GULIAN VERPLANCK.

Committee of the Health-Office.
JOHN OOTHOUT.
JACOB ABRAMSE.
RICHARD BAYLEY.